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Report Project No. 13160 Interim Groundwater
Quality Evaluation
Winnebago Reclamation Landfill
Rockford, Illinois

Prepared for:

Respondents Steering Committee Rockford, Illinois

Prepared by:

Warzyn Engineering Inc. Chicago, Illinois

INTERIM GROUNDWATER QUALITY EVALUATION WINNEBAGO RECLAMATION LANDFILL RI/FS ROCKFORD, ILLINOIS

Prepared for:

RESPONDENT'S STEERING COMMITTEE Rockford, Illinois

Prepared by:

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EXECUTIVE SUMMARY

This document has been prepared to provide a summary and evaluation of data collected during Phase I of the Remedial Investigation (RI) being performed at the Winnebago Reclamation Landfill (WRL), also known as Pagel's Landfill, located near Rockford, Illinois and to provide recommendations for Phase II of the RI. The August 1987 Work Plan, which outlines the details of the Phase I RI, specifies that an Interim Groundwater Quality Evaluation Report be prepared after collection of Round 2 groundwater samples and Round 3 leachate samples to determine the following:

- The likely sources of contaminants in groundwater at the western margins of the WRL;
- The likely sources of contaminants (if any) in groundwater west of Killbuck Creek, a creek located to the west of the landfill;
- · The likely sources of contaminants to Killbuck Creek, if any;
- The necessity for and scope of installation of Phase II groundwater monitoring wells; and
- The necessity for and details of Round 3 and 4 groundwater sampling and analyses.

Based upon comments received on a draft of this report, the scope of this report was expanded to include the Round 4 leachate data, resurvey of project wells, and an expanded discussions of additional data from previous reports.

The WRL accepts municipal wastes and sewage sludge. The landfill has a liner and leachate collection system, and a landfill gas extraction system. East, and hydraulically upgradient of the WRL, is the Acme Solvents Reclaiming, Inc. (Acme Solvents) Superfund National Priority List site. The Acme Solvents site was used for the disposal of non-recoverable solvents, solvent still-bottoms, paints and oils between 1960 and 1973. Waste materials were dumped into unlined lagoons, stockpiled or buried at the Acme Solvents site. This report concludes that a VOC groundwater plume originating upgradient of WRL has been overprinted by a dominantly inorganic WRL landfill leachate plume. The WRL plume originates at about the center of the landfill and extends to the furthest downgradient well G116A passing beneath Killbuck Creek.



The WRL, about five miles south of Rockford, Illinois, is situated on a 60 acre parcel on a topographic high between Killbuck Creek to the west and unnamed intermittent streams to the north and south. The surficial unconsolidated deposits are predominantly glacial drift ranging from a thin mantle over the dolomite bedrock at the Acme Solvents site to greater than 70 feet filling the bedrock valley west of WRL. The unconsolidated deposits are predominantly sand and gravel underneath and north of WRL with a silty clay to the south of WRL. The underlying bedrock surface is highly variable due to paleoerosional features. The dolomite is generally fractured but the intensity is variable. Chert layers or nodules were commonly noted on boring logs as were vugs (void spaces), but cavernous zones were not reported. A zone of highly fractured, soft dolomite was noted near the bedrock surface in the vicinity of the northern intermittent stream on the Acme Solvents site.

Groundwater generally flows from east (from Acme Solvents) to west towards WRL. A groundwater high is located in the vicinity of a bedrock ridge between WRL and Acme Solvents, such that the water table slopes to the west, northwest, and southwest from that point. The water table is located within the bedrock in the vicinity of the Acme Solvents site and westward to an approximately northeast-southwest line drawn from wells B10 to B13 (approximately the eastern quarter of WRL). West from this northeast-southwest line, the water table occurs in the more permeable sand and gravel. The sand and gravel and dolomite aquifer appears to be under semi-confined conditions below the silty clay till to the south of the site. The water table surface drops more steeply in the bedrock upland than in the sand and gravel materials of the Killbuck Creek floodplain, consistent with the lower observed permeabilities in the bedrock upland.

A groundwater mound or "high" in the vicinity of the northern intermittent stream noted frequently in previous investigations was also detected in this investigation based on April 6, 1988 water level data. It is thought that the mounding is due to higher localized recharge rates in the area due to the thin veneer of sediments and the highly fractured dolomite beneath the northern intermittent stream. Downward vertical movement of water is inferred from the potential vertical gradients, however, flow paths will be largely



controlled by the permeability distribution within the dolomite. Some water level measurements made at well nests in the bedrock during the Phase I RI indicate anomalous results, which can be attributed to preferential flow in the fractured dolomite. A variety of reports have noted anomalies in the water level data collected from wells in the fractured bedrock upland indicating the complexity of flow in this dolomite aquifer. These reports include the Illinois State Geological Survey (Herzog, et al., 1988), the United States Geological Survey (see letter dated 4/13/89, Mr. B. Schorle, U.S. EPA, to Mr. J. Hill, Warzyn), Hickok (1985), and E.C. Jordan (1986).

This Phase I RI included the installation of 15 monitoring wells west of Lindenwood Road, and collection and analyses of samples from the 15 new monitoring wells, 26 monitoring wells installed during previous investigations and one private well. Fifteen single-well field permeability tests were performed. Water levels were collected on an approximately monthly basis. All project wells were resurveyed in August 1989 by an Illinois Registered Land Surveyor.

Fourteen monitoring wells were sampled and analyzed during Round 1 (April 1988) for volatile organic compounds (VOCs) by gas chromatograph (GC) with ten percent confirmed by gas chromatograph/mass spectroscopy (GC/MS), pesticides/PCBs, 23 metals, total phenols, field pH, field specific conductance, total alkalinity, chlorides and cyanide. Well G118 was not sampled because it was damaged by frost heave. Twenty-five monitoring wells and one private well were sampled and analyzed for the indicator parameters; VOCs by GC (with 10% GC/MS confirmation), chlorides, total alkalinity, total phenolics, arsenic, barium, cadmium, field pH and field specific conductance. During Round 2 (June 1988) forty-one monitoring wells and one private well were sampled and analyzed for the indicator parameters described above.

The Phase I RI included the collection of four rounds of leachate samples from the east manhole, west manhole and four different gas/leachate extraction wells during each round. Round 1 (April 1988) leachate samples were analyzed for VOCs by GC (with 10% confirmation by GC/MS), SVOCs, 23 metals, chlorides, total alkalinity,



pesticides/PCBs, phenol, cyanides, field pH and field specific conductance. Rounds 2 (June 1988) and 3 (August 1988) samples were analyzed for the indicator parameters; VOCs by GC, chlorides, total alkalinity, total phenolics, arsenic, barium, cadmium, field pH and field specific conductance. Round 4 (June 1989) samples were analyzed for the above indicator parameters except that VOCs were analyzed by GC/MS to improve data quality.

One round of surface water and sediment samples were collected from Killbuck Creek concurrent with Round 1 groundwater sample collection activities. The five surface water samples were analyzed for the same indicator parameters as for Round 2 leachate samples. Sediment samples were analyzed for VOCs (by GC/MS), SVOCs, pesticides/PCBs, 23 metals and cyanide.

Volatiles data of acceptable quality were obtained from leachate samples analyzed by GC/MS and are the focus of this discussion. The leachate samples (analyzed by GC/MS) generally contained higher concentrations of aromatic VOCs such as benzene, ethylbenzene, toluene, and xylenes than the chlorinated VOCs vinyl chloride and dichloroethene. Tetrachloroethene was detected only once and trichloroethene was not detected at all. The Jordan (1984) leachate sample results generally follow these same concentration trends indicating that the current leachate VOC composition is similar to the VOC makeup of leachate of 1984, indicating that the leachate has not changed significantly over this time span. The WRL leachate has a high inorganic component consistent with typical sanitary component leachates, except it has higher than typical chloride and sodium content.

Since the WRL is consistently hydraulically downgradient of the Acme Solvents site, it is apparent that groundwater chemistry is important in the process of distinguishing the possible impacts from each site. The high inorganic component in the leachate is used to discriminate between WRL leachate affected and unaffected wells on a trilinear plot of the major cations (calcium, magnesium, and sodium plus potassium (percent of meq/l)). The WRL leachate samples plot as a sodium plus potassium rich water, while upgradient or unaffected wells plot as magnesium and calcium rich, forming the end points of a continuum encompassing wells affected by WRL leachate. This approach has been used elsewhere to discriminate between contaminated and uncontaminated water samples.



This major cation discrimination approach is supplemented by the strong positive correlation between sodium plus potassium and the chloride ion ($r^2 = 0.998$). The near perfect correlation between chloride and sodium plus potassium and the large chloride concentration contrast between groundwater and WRL leachate indicates that chloride can be used to discriminate between wells affected and unaffected by WRL leachate. This approach has also been used elsewhere to discriminate between contaminated and uncontaminated groundwater samples. Chloride is widely recognized as a conservative, non-reactive parameter in groundwater systems, which means it does not biodegrade or react with the aquifer matrix. The only attenuation mechanism generally applicable to chloride is dilution during transport. The conservative non-reactive nature of chloride coupled with the high contrast in chloride concentration between leachate and groundwater makes chloride a very good "tracer" of the presence of leachate in groundwater.

There are two general areas where chloride concentrations appear to be elevated indicating the presence of leachate;

- · The northwest quadrant of WRL; and
- · at Well G110.

Within the WRL leachate plume, the SDWA Primary Drinking Water standards were exceeded for only barium at wells MW106 and P1. SDWA secondary standards were exceeded for chloride (B15, B15R, and MW106), iron (MW106 and P1), and manganese (B15R, MW106, P1, P3R, and P4R). The secondary standards are based on aesthetic considerations only. VOCs which could potentially be attributed to WRL that are designated as hazardous substances in Table 302.4 of 40 CFR Part 302.4 are 1,2 dichloropropane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chlorobenzene, benzene, xylenes and toluene. None of these were present in samples from the furthest downgradient well G116A, indicating that these constituents are being attenuated to non-detectable levels during transport to G116A.



Samples from wells neighboring well G110 do not contain elevated chloride concentrations, indicating that any excursion of leachate is quite limited. The chloride anomaly at G110 has been previously attributed to surficial leachate seeps along the southern slope. Recently, it was learned that the leachate hauling trucks were loaded at the base on the slope near G110. Both of these conditions could have contributed to the presence of chlorides at well G110. The seeps are currently under control and leachate is now loaded on top of the landfill.

Distribution of chlorinated ethenes in the groundwater form a different pattern than that of chlorides. VOCs are found both inside and outside (horizontally and vertically) of the chloride plume adjacent to the northwest quadrant of the site indicating that the WRL leachate chloride plume is overprinting a pre-existing VOC plume. The highest concentrations of total chlorinated ethenes are found at monitoring well B4 on the Acme Solvents site with the second highest levels found just west of Lindenwood Road south of WRL. Both of these areas are upgradient of the WRL, and not associated with elevated levels of chlorides indicating WRL leachate is not the source of these VOCs. The highest concentrations of VOCs being found at monitoring well B4 is consistent with the disposal of large quantities of solvent wastes. The definition of the VOC plume downgradient from Acme Solvents is not complete. Given the history of waste filling and the high VOC concentration noted at B4, a larger plume is expected.

Elevated alkalinity and depressed pH were noted at well B4 (at Acme Solvents) and at wells adjacent to the WRL. The alkalinity and pH follow a similar pattern as that for the VOCs. Alkalinity measurements typically reflect the amount of bicarbonate/carbonate equivalents present, but may also include other titratable species. As discussed above, elevated chlorides, which are a reliable indicator of the presence of WRL leachate follow a different pattern than these geochemical anomalies. This indicates that WRL leachate is not responsible for these anomalies where elevated chlorides are not present, which is consistent with the upgradient location of these wells. Because elevated alkalinity and depressed pH are found at upgradient well B4 at Acme Solvents, it becomes possible that the Acme Solvent site may be responsible for these geochemical anomalies. Although it has not been qualitatively determined, it also seems possible that the carbon



dioxide portion of the landfill gas (if present) could be a potential cause for the geochemical anomalies at the landfill borders; the potential for this should be small since a landfill gas extraction system is in place and has been operational since 1980.

Factors which may be playing a role in the apparent distribution of VOCs in the groundwater are:

- 1) intermittent and spatially variable recharge from the unnamed intermittent stream could breakup the Acme Solvents VOC plume as modeled by Jordan (1984);
- 2) biodegradation may alter the pattern of VOCs in groundwater;
- 3) the pattern of VOCs may be an artifact of the current well placement in a fracture flow dominant aquifer (i.e., a higher density of wells are present in the area just west of Lindenwood Road south of WRL, increasing the chances of intercepting a VOC containing fracture); and
- 4) a second source of VOCs.

The issue of landfill gas migration as a potential source of VOCs in the groundwater just west of Lindenwood Road south of the WRL has been been raised, but is not considered viable because;

- a previous study (1980) found landfill gas to be migrating off-site, though migration was only found in the highly permeable unsaturated soils above bedrock, indicating that the gas was not in contact with the groundwater table present in bedrock in the vicinity;
- a gas extraction system has been in operation since 1980 controlling the landfill gas migration;
- the WRL leachate contains lower concentrations of VOCs than the groundwater samples from wells southeast of the WRL, indicating that it is unlikely that significant amounts of VOCs could be or were in the landfill gas; and
- the WRL generally accepted municipal wastes with limited quantities of Illinois Special Waste, and so would not be expected to be able to release significant amounts of VOCs, as would a solvent disposal site.



There were no upstream/downstream trends in the results of the surface water or sediment samples. Results were either comparable to background or attributed to field/laboratory contamination. Results of surface water samples collected and analyzed by the USGS from a surface water monitoring station for Killbuck Creek downstream from the WRL at the bridge at state Highway 251 showed little correlation to the discharge rate of that stream. Comparison of the data from this investigation to the USGS data indicates that the results were similar in value. Since upstream/downstream trends in the Phase I results are not evident in the surface water samples from this study, and because there is little correlation between discharge and surface water quality as measured by the USGS, based on the available data, WRL does not appear to be impacting the water or sediment quality of Killbuck Creek.

The evaluation of analytical results from groundwater samples indicates the existing monitoring network is adequate to define the extent of releases of hazardous substances from the WRL. Thus, additional monitoring well installation is not recommended. Phase II investigative efforts should focus on the following:

- Round 5 leachate samples should be analyzed for VOCs, SVOCs, pesticides/PCBs, 23 metals plus total and hexavalent chromium, phenolics, chloride, alkalinity, cyanide, field pH, and field specific conductance. Round 5 leachate samples should be analyzed using GC/MS methodologies to improve data quality. Detection of a PCB in two samples in previous rounds, and the resulting questions on the analytical response requires additional testing. The landfill gas collection headers will be disconnected and leachate risers purged 24-hours prior to the collection of the leachate samples. Gas well D1 will be sampled to verify that the acetone found was due to lab/field contamination. The other leachate sampling points will be gas wells E3, N8, L2, and the east and west manholes.
- · Wells with elevated chloride concentrations and those which are located immediately adjacent to the landfill should be sampled during Rounds 3 and 4. Monitoring wells to be sampled include B13, B15R, B15P, G109, G109A, G110, G111, G114, G115, G116, G116A, P1, P3R, P4R, and P6.
- · Round 3 groundwater samples should be analyzed for VOCs by GC/MS (since the dominant presence of the cis-isomer of 1,2 dichloroethene is documented, standard CLP-type protocol can be used), SVOCs, arsenic, barium, cadmium, hexavalent chromium, total chromium, phenolics, chloride, alkalinity, cyanide, field pH, and field specific conductance. This will provide additional



documentation that the few HSL compounds, which are not chlorinated solvents, currently detected adjacent and downgradient from the WRL are being rapidly attenuated. Sampling should also be analyzed for the standard water chemistry parameters sulfate and nitrate. Round 4 groundwater parameters will include VOCs (by GC/MS), arsenic, barium, cadmium, hexavalent chromium, total chromium, phenolics, chloride, alkalinity, cyanide, field pH and field specific conductance unless results from Round 5 leachate sampling indicates additional parameters are warranted.

- Water level monitoring should continue on a monthly basis for a six-month period. Three staff gauges should be installed in Killbuck Creek and be included as part of the monthly monitoring level program. The additional water level monitoring is needed due to the complex nature of groundwater flow. The collection of water levels from the creek is necessary to verify that the creek is acting as a groundwater discharge zone.
- · Plug and abandon well P7 since it is reported to be damaged.

Perform 12 additional single-well permeability tests at B9, B10, B10A, B12, B13, G108, G109A, G110, G113, G113A, G114 and P6, to gain more information on the variability in the permeability of the dolomite.



INTERIM GROUNDWATER QUALITY EVALUATION

SECTION 1 INTRODUCTION

1.1 Purpose

This document has been prepared to provide a summary and evaluation of data collected during Phase I of the Remedial Investigation (RI) being performed at the Winnebago Reclamation Landfill (WRL), also known as Pagel's Landfill, located near Rockford, Illinois, and provide recommendations for Phase II. The August 1987 Work Plan, which outlines the details of the Phase I RI, specifies that an Interim Groundwater Quality Evaluation Report be prepared after collection of Round 2 groundwater and Round 3 leachate samples. Based upon comments received on a draft of this report, the scope of the report was expanded to include Round 4 leachate data, resurvey of project wells and expanded discussions of available background data. This report contains the resulting groundwater, leachate, surface water and sediment data along with data obtained during subsurface drilling and monitoring well installation. The collected data is evaluated to determine the following as required by the Work Plan:

- The likely sources of contaminants in groundwater at the western margins of the WRL;
- The likely sources of contaminants (if any) in groundwater west of Killbuck Creek, a creek located to the west of the landfill;
- · The likely sources of contaminants to Killbuck Creek, if any;
- The necessity for and scope of installation of Phase II groundwater monitoring wells; and
- The necessity for and details of Round 3 and 4 groundwater sampling and analyses.

The assessment of the need for Phase II data gathering activities is made in the last chapter of this document. Section 2 through 4 provide a description and discussion of data collected during Phase I supplemented by data from previous studies. Eight and one-half by eleven inch and eleven by twenty-four inch illustrations are referred to as Figures, while large twenty-four by thirty-six inch illustrations are referred to as Drawings. The Figures and Drawings have separate numbering systems. Appendices are provided in a separate volume.



1.2 Authorization

This investigation is being performed on behalf of the Pagel's Landfill (WRL) Potentially Responsible Parties (PRPs) who have entered into an Administrative Consent Order with the United States Environmental Protection Agency (U.S. EPA), effective October 16, 1986.

This investigation is being performed following the "Work Plan, Pagel's Pit Landfill Remedial Investigation/Feasibility Study" dated August 1987. The PRPs have retained Warzyn Engineering Inc. (Warzyn) of Madison, Wisconsin (Corporate offices) to perform this task and the other tasks in the Remedial Investigation/Feasibility Study (RI/FS) required under the consent agreement.

1.3 Site Location and Function

The WRL is located about 5 miles south of Rockford, Illinois. The WRL occupies approximately 60 acres west of Lindenwood Road (Figure 1). The landfill has approximately two years of capacity remaining. The landfill has been in operation and licensed since 1972. The facility has a continuous bituminous liner and a leachate collection system covering the entire base of the landfill. The leachate is collected and disposed of off-site. The leachate is collected through a perforated pipe system in a layer of sand on top of the liner, which drains to central collection manholes where leachate is extracted. Leachate is also removed via wells installed into the waste. These extraction wells, operational since 1980, are also used for the removal of landfill gas (WRS, 1984).

Wastes accepted at the landfill are composed primarily of municipal refuse and sewage sludge. Prior to the start-up in 1984 of a sludge dryer system fueled by gas from the landfill, the landfill accepted wet sewage sludge. Only dried sewage sludge has been placed in the landfill since that time. A very limited quantity of Special Wastes were disposed of at the facility prior to December 1985. Illinois Special Wastes were accepted at WRL under permits issued by the Illinois Environmental Protection Agency (IEPA). Permits were obtained for some wastes which were not actually disposed of at the landfill (WRS, 1984). For more details, refer to "Comments Submitted to the U.S. EPA on its proposed listing of Pagel's Pit on the Superfund National Priorities List" (WRS, 1984).



East of the WRL on an approximately 20-acre parcel is the Acme Solvents Reclaiming, Inc. (Acme Solvents) site, which was active from 1960 to 1973. The Acme Solvents property adjacent to the WRL was used for disposal of waste generated by the Acme Solvents' reprocessing facilities in Rockford, Illinois. The materials disposed of at the site are generally undocumented, but are known to have included solvent still-bottom sludges, nonrecoverable solvents, paints and oils. The waste materials were transported to the site in drums which were either emptied into unlined disposal lagoons or stockpiled. The IEPA indicates four lagoons were actively used for the disposal of waste materials on-site. IEPA additionally indicates that, when the site was closed, between 10,000 and 15,000 drums may have been present on the site. The total quantity of waste disposed of at the site during its operation is unknown (Ecology and Environment 1983; Jordan, 1984).

IEPA inspections in late 1972 and early 1973 indicated the waste materials in the Acme Solvents ponds were not removed, but were covered with soil borrowed from other portions of the site. It it also reported that an unknown number of drums stored on-site were crushed and buried, rather than removed (Ecology and Environment, 1983). Clean-up and removal of buried drums and contaminated soils from the Acme Solvents site began in August 1986. The Acme Solvents site has been listed on the National Priorities List (NPL) since 1983. The site is currently undergoing an additional groundwater investigation.

1.4 Previous Investigations

The area adjacent to the WRL and the Acme Solvents facility has been investigated a number of times. The previous investigations are:

- "Extent of Source of Groundwater Contamination Acme Solvents Pagel Pit Area near Morrisville, Illinois", Ecology and Environment, March 1983.
- · "Acme Solvents Superfund Site, Winnebago County, Illinois, Remedial Investigation", E.C. Jordan Company, September 1984.
- "Acme Solvents Superfund Site, Winnebago County, Illinois, Feasibility Study",
 E.C. Jordan Company, February 1985.



- · "Supplemental Investigation Winnebago Reclamation Landfill, Rockford, Illinois", Warzyn Engineering Inc., March 1985.
- Data Analysis and Summary Report for Deep Groundwater Assessment, Acme Solvents Solvents Superfund Site", E.C. Jordan Company, May 1986.

Monitoring wells installed for these previous investigations have been incorporated into the Phase I RI at the WRL. The data collected during previous report efforts are considered in the evaluation of site conditions in this document. Complete data sets from previous reports are not incorporated into this document, but are referenced where appropriate.

During previous investigations groundwater samples have been collected on or about October 25, 1982, September 6, 1983, May 1, 1984, December 27-29, 1984, January 2-4, 1985 and November 5, 1985. The October 1982 samples were collected by Ecology and Environment from monitoring wells B1 through B16 plus five water supply wells. The samples were analyzed for priority pollutants (volatile and semivolatile organics and metals). Ecology and Environment collected groundwater samples in September 1983 from monitoring wells B1 through B16 and five water supply wells. The samples were analyzed for volatile and semivolatile organic compounds (see memorandum Tom Koch to File, December 28, 1983). E.C. Jordan Co. collected groundwater samples in May 1984 from G101, G102, MW101, MW102, MW103, MW104, MW105, MW106, MW107, B1 through B12, P1, P3, P4, P5, P7 and water supply wells A through O. The samples were analyzed for volatile and semivolatile organic priority pollutants and PCB's.

In December 1984 and January 1985, Warzyn collected groundwater samples from monitoring wells B8, B9, B10, B10A, B11, B11A, B12, B13, B14, B16, B16A, P1, P3, P4, P5, P6, P7, G102, G107, G108, G109, G109A, G110, G111, MW104, MW106, MW107, and water supply wells G and H. These samples were analyzed for VOCs, arsenic, barium, calcium, phenols, chloride and alkalinity. E.C. Jordan Co. (1986) collected samples from wells MW201A, MW201B and MW202 which were analyzed for volatile and semivolatile organic priority pollutants.



Historical VOC data by well is presented in Appendix C. No attempt has been made to re-validate the data except that discussions do not include acetone and methylene chloride results because they are often field/laboratory contaminants.

1.5 Current Investigation

Due to the uncertainty associated with determining the extent and magnitude of potential releases from the WRL site and the role of releases which may be attributable to Acme Solvents, a phased RI was undertaken. The initial phase of the investigation (Phase I), which this report evaluates, consisted of the following elements;

- Collection of four rounds of leachate samples from various portions of the facility. Leachate samples were analyzed to evaluate potential hazardous constituents contained in the landfill leachate.
- · Installation of 15 new groundwater monitoring wells located adjacent to and downgradient from the WRL.
- Groundwater sampling Sampling of 26 previously installed wells, 15 wells installed as part of the Phase I investigation, two new wells installed by the Acme Solvents PRPs, and 1 private well. Wells immediately adjacent to the landfill were analyzed for volatile (VOCs) and semi-volatile organic compounds (SVOCs), pesticides/PCBs, metals, and other parameters as detailed in Section 2.2.1. during Round 1, with the remaining wells analyzed for a lesser set of indicator parameters as described in Section 2.2.1. During Round 2, all project wells were analyzed for these indicator parameters (See Section 2.2.2).
- Aquifer evaluation 15 single-well field permeability tests were performed on groundwater monitoring wells, and groundwater levels were collected on an approximately monthly basis.
- · Sampling of Killbuck Creek Surface water and sediment samples were collected from Killbuck Creek during Round 1 groundwater sampling. Sediment samples were analyzed for the VOCs, SVOCs, pesticides/PCBs, metals and cyanide as outlined in Section 2.4 and surface water samples were analyzed for indicator parameters (VOCs, chloride, etc.).

Based upon the data collected during the Phase I investigation, an evaluation is made in this report as to the necessity for and scope of the Phase II investigation.



SECTION 2 PHASE I DATA COLLECTION ACTIVITIES

This section provides a brief summary of work performed during the Phase I portion of the RI. The activities were performed in a manner consistent with the approved Work Plan, Health and Safety Plan, Sampling Plan, and Quality Assurance Project Plan developed for the investigation.

2.1 Phase I Monitoring Well Installation

During Phase I, 15 new groundwater monitoring wells were installed adjacent to the WRL facility. The locations of Phase I groundwater monitoring wells; P3R, P4R, B15P, G112, G113, G113A, G114, G115, G116, G116A, G117, G118R, G118A, G119, and G119A are shown on drawing 13160-1. Monitoring wells P3R and P4R were installed to replace abandoned wells P3, P4, and P5. Monitoring well G118 had to be replaced, due to frost heave of the casing at the surface, the replacement well installed in June 9, 1988 was designated G118R.

Drilling and monitoring well installation was performed by Exploration Technology, Inc. (ETI) of Madison, Wisconsin and observed by Warzyn personnel. A Warzyn geologist was on-site during drilling operations to log boreholes, provide technical supervision, and perform air monitoring related to health and safety concerns.

The deepest borehole at a nested well location was sampled at 5-foot intervals in unconsolidated material to bedrock or the terminus of the boring. Unconsolidated materials were collected using a split-spoon sampler (ASTM Method D-1586). When bedrock was encountered, rock was cored to the terminus of the boring using a HW (2-7/8-inches diameter) core barrel.

The monitoring wells installed were constructed with 2-inch inside diameter stainless steel screen and riser pipe to an elevation above the anticipated seasonal high groundwater elevation. Galvanized steel riser pipe was used above the assumed high groundwater elevation to the ground surface. Wells installed to monitor the groundwater surface (water table wells) were installed with 10-foot screens. Monitoring wells P3R, G112, G113, G114, G115, G116, G117, G118R, and G119 were instrumented as water table wells. Wells instrumented to monitor groundwater quality and



groundwater levels deeper in the aquifer (piezometers) were installed with 5-foot well screens. Monitoring wells P4R, B15P, G113A, G116A, G118A, and G119A were instrumented as piezometers.

The annular space between the well materials and the edge of the borehole was backfilled to approximately two-feet above the top of the screen with flint sand. Above the flint sand a two-foot bentonite pellet seal was placed. Bentonite grout was placed via a tremie pipe to fill the remaining annular space to the surface. At the ground, surface locking protective casings were installed.

To minimize possible contamination of monitoring wells, drill rig and drilling tools were decontaminated by steam-cleaning. The drill rig and drilling tools were steam-cleaned prior to use and between each drilling location. The split-spoon sampler and/or core barrel were cleaned between samples using a trisodium phosphate wash followed by clean water rinses. Well construction materials were also steam-cleaned prior to use.

Appendix A contains boring logs for borings performed as part of the Phase I investigation. Appendix B contains well installation details for monitoring wells installed as part of Phase I.

2.2 Groundwater Sampling

The initial set of groundwater samples were collected the week of April 6, 1988 (Round 1) with a second set of samples collected the week of June 9, 1988. Samples from the two Acme Solvents PRP monitoring wells (STI-5I and STI-5D) could not be obtained concurrent with the other samples since the wells were not installed when sampling occurred. The completely validated data sets for these two wells are not yet available from the Acme Solvents PRPs and are not included in this report.

Analytical laboratory results for groundwater analyses are contained in Appendix C. Monitoring well locations are shown on drawing 13160-1.



2.2.1 Round 1 Groundwater Sampling

Monitoring wells B15, B15R, B15P, G109, G109A, G115, G116, G116A, G117, G118A, MW106, P1, P3R, and P4R were sampled and analyzed in Round 1 for the following parameters:

- Volatile organic compounds (VOCs) by gas chromatograph (GC). Ten percent of the samples were confirmed by gas chromatography/mass spectroscopy (GC/MS);
- Semi-volatile organic compounds (SVOCs);
- Pesticides/PCBs;
- · 23 metals (dissolved);
- · Total phenolics;
- · Field pH;
- Field specific conductance;
- Total alkalinity;
- · Chlorides; and
- · Cyanide.

G118 was not sampled because it was damaged by frost heave.

A second set of wells which included: B4, B6S, B6D, B7, B9, B10, B11, B11A, B12, B13, B14, B16, B16A, G107, G108, G110, G112, G113, G113A, G114, G119, G119A, P6, P7 and MW105 and private well 1 (PW1) were sampled for indicator parameters as follows:

- · VOCs (by GC) with 10% GC/MS confirmation;
- · Total phenolics;
- · Field pH;
- Field specific conductance;
- Total alkalinity;
- · Chlorides;



- · Arsenic (dissolved, except PW1 unfiltered);
- · Barium (dissolved, except PW1 unfiltered); and
- · Cadmium (dissolved, except PW1 unfiltered).

2.2.2 Round 2 Groundwater Sampling

Wells B4, B6S, B6D, B7, B9, B10, B11, B11A, B12, B13, B14, B15, B15R, B15P, B16, B16A, G107, G108, G109, G109A, G110, G111, G112, G113, G113A, G114, G115, G116, G116A, G117, G118A, G118R, G119, G119A, P1, P3R, P4R, P6, P7, MW105, MW106 and private well 1 (PW1) were sampled during Round 2. Samples from these wells were analyzed for the indicator parameters described in Section 2.2.1. See Appendix C for results of Round 2 sampling.

2.3 Leachate Sampling

Four sets of leachate samples were collected during Phase I. Leachate sample Rounds 1 and 2 were collected concurrent with Round 1 and Round 2 groundwater sampling. Round 3 leachate samples were collected during the week of August 8, 1988, and Round 4 on June 8, 1989. On each occasion, an attempt was made to collect six leachate samples. Two of the six samples in each set were from leachate extraction manholes, which are tied to the base leachate collection piping system. The remaining four samples in a set of six samples were collected from various extraction wells located in the eastern portion of the site. Figure 2 shows the locations of the manholes and extraction wells. Leachate samples were collected from the following locations;

- Round 1 West manhole, A1, E7, F1, K2, (east manhole dry)
- · Round 2 Both manholes, A3, B1, G3, G7
- · Round 3 C3, C6, H2, I5, (both manholes dry)
- Round 4 D1, G4, F7, East Manhole, (West manhole dry, C6 dry)

Leachate samples were not filtered prior to analysis. Round 1 leachate samples were analyzed for VOCs by GC (with one sample confirmed by GC/MS), SVOCs, 23 metals, chloride, alkalinity, phenol, cyanide, field pH, field conductivity, and pesticides/PCBs. Rounds 2 and 3 samples were analyzed for VOCs by GC, arsenic, barium, cadmium,



chloride, alkalinity, and phenol. One Round 2 sample had VOCs confirmed by GC/MS. Due to previous analytical difficulties, all Round 4 samples were analyzed by GC/MS for VOCs. The gas extraction wells were disconnected from the extraction system and purged of standing leachate 24 hours prior to Round 4 sampling. Round 4 samples were also analyzed for alkalinity, chloride, phenol, field pH, field specific conductance, arsenic, barium and cadmium. Analytical laboratory results for leachate samples and more detailed parameter lists are contained in Appendix C.

2.4 Surface Water and Sediment Sampling

Surface water (SW) and sediment (SD) samples were collected from five locations along Killbuck Creek in the immediate vicinity of WRL (see Drawing 13160-1). Sampling proceeded from the furthest downstream location (SW1/SD1) toward the furthest upstream location (SW5/SD5). At each sample location, the surface water sample was collected first followed by the collection of the sediment sample.

Sediment samples were analyzed for VOCs (by GC/MS), SVOCs, pesticides/PCBs, 23 metals and cyanide. Surface water samples were analyzed for VOCs (by GC with one sample confirmed by GC/MS), arsenic, barium, cadmium, field specific conductance, field pH, chloride, alkalinity and phenols. Surface water samples were not filtered prior to analysis. Results of sediment and surface water sampling and more detailed parameter lists are contained in Appendix C.

2.5 Permeability Testing

Permeability testing was performed on monitoring wells; B11, B11A, B15, B15P, B16, B16A, G109, G109A, G111, G115, G116, G116A, G117, G119, and G119A. Permeability testing was performed during the week of August 1, 1988. Two different permeability test procedures were used. Piezometers were tested by suppressing the water level using a compressed air system. Rapid release of pressure in the well allowed the suppressed water levels to recover to their original levels. Recovery of groundwater levels were recorded using a pressure transducer system attached to a digital data logger. Tested water table wells had a small volume of water removed using a bailer; recovery



was recorded using a pressure transducer and digital data logger. Results of field permeability testing are summarized in table 1, with detailed data assessments provided in Appendix D. Results were evaluated using the method of Bower and Rice (1976).

2.6 Survey

All project wells were resurveyed in August 1989 by an Illinois Registered Land Surveyor. The horizontal location (Illinois State Plane Coordinates, West Zone) of the wells were surveyed to an accuracy of ± 0.1 foot. Elevations referenced to mean sea level (MSL) (National Geodetic Vertical Datum) were obtained for the top of the protective casing (TOC) and inner casing (well pipe) (TIC) to an accuracy of ± 0.01 foot. The ground surface elevations were surveyed to an accuracy of ± 0.1 foot. Elevation data are provided in Appendix B with well locations shown on drawing 13160-1.

2.7 Water Level Monitoring

The variable groundwater flow patterns noted in previous investigations near WRL necessitated the collection of multiple sets of groundwater levels from functioning groundwater wells to further understand the flow dynamics. Groundwater levels were obtained on the following dates:

- April 6, 1988
- May 17, 1988
- · June 16, 1988
- August 5, 1988
- August 29, 1988
- October 25, 1988
- November 9, 1988
- · June 8, 1989

Water level data are included in Appendix E.



SECTION 3 PHYSICAL SETTING

The site is located in the Rock River Hill Country of the Till Plains Section of the Central Lowland Province of Illinois (Figure 3) (Leighton, et al., 1948). The Rock River Hill Country is characterized by subdued rolling hills rising above alluvial valleys. An extensive surface drainage system has developed in the uplands, making lakes, ponds and marshes rare. Major river valleys are broad with steep walls and alluvial terraces (Hackett, 1960, Leighton, et al., 1948).

The site is located on a topographic high between Killbuck Creek to the west, and unnamed intermittent streams to the north and south (Figure 1). Killbuck Creek, a perennial stream, flows within 250 feet of the western WRL boundary and merges with the Kishwaukee River about two miles to the north. The confluence of Killbuck Creek and the northern stream is about 1000 feet northwest of the site, and the confluence of the southern, intermittent, unnamed stream and Killbuck Creek is about 1200 feet south of the WRL. The ground surface ranges from elevation 790 feet (MSL) on top the the landfill to 708 feet (MSL) in the floodplain of Killbuck Creek (see Drawing 13160-1). There are no other significant surface water bodies within one mile of the WRL.

The average precipitation for the area is 38 inches per year; 66% being received between April and September, with an average snowfall of 33 inches. In winter, the average temperature is 23°F, and the average summer temperature is 71°F (USDA, 1980).

The land use around WRL is a mix of industrial, agricultural, commercial and rural residential. East of the site is the former Acme Solvents facility, an industrial waste disposal facility which operated from 1960 to 1973 disposing of wastes generated by Acme Solvents solvent reprocessing plant in Rockford, Illinois. Wastes which were not reclaimed at their Rockford plant were disposed of on the Acme Solvents site. The Acme Solvents site is listed on the National Priority List and is subject to an ongoing groundwater investigation. An inactive alcohol production plant and an active sewage sludge drying plant are immediately north of the landfill. The Rockford Skeet Club is



across Lindenwood Road to the northeast. There are residences north, south, southwest, and southeast of the site (see Drawing 13160-1).

3.1 Regional Geology

3.1.1 Unconsolidated Materials

The surficial unconsolidated materials of the area are predominantly glacial drift deposits. Glacial drift deposits include both ice and water-lain materials. Figure 4 is a geologic map of the surficial unconsolidated materials in the vicinity of WRL. The area beneath and east of the site is mapped as poorly-sorted sand and gravel glacial ice-contact deposits of the Wasco Member of the Henry Formation. West of the site in the Killbuck Creek Valley, and to the north of the site, the surficial sediments are mapped as the sand and gravel outwash deposits of the Mackinaw Member of the Henry Formation. Modern stream deposits (Cahokia Alluvium) overlie the Mackinaw Member in the floodplain of Killbuck Creek. The surficial deposits south of the site are mapped as the Esmond Member of the Glasford Formation, a silty clay till (Figure 4). The Esmond Till was deposited during the Illinoian Stage of the Pleistocene (Berg, et al., 1984). The Esmond till has an upper silty facies and a lower silty clay facies. It is gray and contains few pebbles and cobbles. It is characterized by a high illite content (Willman and Frye, 1970).

3.1.2 Bedrock

The unconsolidated sediments in the region are underlain unconformably by rocks of the Ordovician, Cambrian and Precambrian Systems (Figure 5). The topography of the bedrock surface in the vicinity of the site is shown in figure 6. In Illinois, the Wisconsin Arch has gentle slopes (20 feet per mile), leading to the presence of the Galena Group at the bedrock surface over a broad area (Berg, et al., 1984). The Galena Group of the Ordovician System dominate the bedrock surface in the region. Older rocks of the Platteville and Ancell Groups are at the bedrock surface due to erosion which formed the preglacial Rock, Troy, Pecantonica and Sugar Bedrock Valleys (Figure 5). The WRL appears to be on the eastern edge of the preglacial Rock River Valley.



The Galena and Platteville Groups are primarily composed of carbonate rocks (90%), and are subdivided based on the amount of silt and clay. Disseminated siliceous minerals, shale beds, chert nodules, thin sandstone beds, and thin bentonite beds make up the remainder of these two groups. Other features which are used to identify the strata are fossils, chert content, bedding, shale partings, corrosion surfaces, and calcarenites. These variations affect the physical appearance of the strata. The argillaceous (clayey) units trend towards being finer grained, less dolomitic, thinner bedded and weather to a smoother vertical face, whereas the more dolomitic strata, with lesser amounts of fine grained materials, are vesicular and vuggy (Willman and Kolata, 1978).

The Galena Group is 250 to 275 feet thick where overlain by the Maquoketa Shale Group (Willman and Kolata, 1978)(Figure 7). The thickness of the Galena is significantly less (due to erosion) where the Maquoketa Shale is absent. In Winnebago County, the Maquoketa Group is present in the southeast portions of the county and in isolated areas of the northeast portion of the county (Berg, et al., 1984) but is not present in the immediate vicinity of the site. The high purity carbonate Kimmswick Subgroup dominates the Galena Group in thickness (Willman and Kolata, 1978). The Galena Group is generally medium to coarse grained dolomite, while the Platteville is finer grained and thinner bedded (Berg, et al., 1984). The Platteville Group is about 45 feet thick in northwestern Illinois and thickens to the east, reaching 115 feet in thickness near Rockford (Willman and Kolata, 1978). The elevation of the base of the Platteville in the vicinity of the WRL is approximately 500 feet (MSL), as shown in figure 8.

The Galena and Platteville Groups are underlain by the Ancell Group (Ordovician) which consists of two formations, the Glenwood Formation and the St. Peter Formation (Figure 7). The Glenwood Formation is comprised of interbedded dolomite, sandstone and shale. The St. Peter is a fine to coarse grained sandstone. The St. Peter is the surficial bedrock unit at the base of the preglacial Rock, Pecatonica, Sugar and part of the Troy bedrock valleys (Berg, et al., 1984).



Below the Ancell Group is the Cambrian System, which consists of Potosi, Franconia, Ironton-Galesville, Eau Claire and Mt. Simon Formations (Figure 7). These formations consist of sandstone, dolomite and shale. The Cambrian System is underlain by Precambrian granite (Berg, et al., 1984).

3.2 Regional Hydrogeology

The aquifers in northern Illinois can be divided into two major groups; glacial drift aquifers and bedrock aquifers. The glacial drift aquifers are largely sand and gravel outwash deposits filling the preglacial bedrock valleys. These coarse-textured deposits are typically more than 100 feet thick in the Rock River Valley, with thicknesses in excess of 300 feet being noted. The Silurian and Ordovician dolomites are the major upper bedrock aquifers in northern Illinois (Hackett, 1960).

The Galena-Platteville Groups can be considered one hydrostratigraphic unit. The permeability of these Groups is probably the result of a well developed joint and fracture system since wells penetrating the dolomites consistently yield water (Hackett, 1960). Although the dolomite has primary porosity, flow is mainly a function of secondary permeability through joints, fractures, and solution openings (Kay, et al., 1989). Hackett (1960) suggests solution activity has not progressed to the point of cave formation. The regional direction of groundwater movement is toward the Rock River from both the northeast and northwest. Groundwater is discharged to the river or to the outwash deposits beneath the river. The water table in upland areas commonly is below the bedrock surface (Hackett, 1960).

According to White (1969), carbonate aquifers can be classified into diffuse-flow and free-flow aquifers. Free-flow aquifers are characterized by well-integrated systems of solution modified conduits. Diffuse-flow aquifers are characterized by limited solution modification of joints, fractures and bedding planes. On a macro scale, diffuse flow aquifers such as the Galena-Platteville aquifer generally obey Darcy's Law, thus standard aquifer test methods should give reasonable results (White, 1969).

The Ordovician sandstone aquifer (Ancell Group) is hydraulically separated from the overlying Galena-Platteville dolomite aquifer by the low permeability shales and



dolomites of the Glenwood Formation, where present. The Glenwood Formation ranges up to 60 feet thick in southeastern Winnebago County. Within the Ancell Group, groundwater generally occurs under artesian or confined conditions, but limited areas of the Ordovician sandstone aquifer are under water table conditions, such as those areas where the rocks are covered by glacial drift. In the Rockford area, the sandstones generally discharge to the Rock River, except where pumping from municipal wells has induced a cone of depression, modifying flow direction (Hackett, 1960).



SECTION 4 RESULTS AND DISCUSSION

Boring logs for Phase I borings are contained in Appendix A. Phase I well installation details are presented in Appendix B. Results of field and laboratory analyses are listed in Appendix C. A summary and discussion of results by matrix is presented below. Permeability test results and water level measurements are provided in Appendices D and E, respectively.

4.1 Leachate

Four rounds of leachate samples were collected. During each round, leachate was collected from four selected leachate risers and from both east and west leachate collection manholes, when possible. See Section 2.3 for details on sampling locations and parameters. Sample locations are shown on figure 2.

4.1.1 Volatiles

The majority of results for volatiles analyzed by GC are considered estimated or unusable, but acceptable results were obtained for volatiles using GC/MS. A major problem with leachate analyses by GC were matrix interferences resulting in unacceptably low recovery of surrogate compounds. Surrogates are assumed to behave like target compounds and are added to each sample to test if sample matrixes are affecting the detection of target compounds in the sample. The low recovery of surrogates detected in leachate samples indicates less than total recovery of target compounds from the sample and probably an underestimation of analyte concentrations. This problem appeared to be greater for the detector used for detection and quantification of halogenated volatiles than that used for aromatics. Because the detector used for aromatics appeared to be less affected, reported results may have a positive bias toward aromatic compounds.

Rounds 1, 2, and 4 volatiles data of acceptable quality were obtained from leachate samples analyzed by GC/MS. The holding times for Round 4 leachate samples were met for halogenated volatile organic compounds, but exceeded by 1-4 days for non-halogenated volatile organic compounds. The results are summarized in table 2. Although several of the reported compounds were detected in laboratory blanks, concentrations were at least 5 times less than concentrations measured in the leachate samples. The relatively low blank levels were not considered to greatly reduce data quality.



The Round 4 samples were collected 24 hours after purging leachate from the gas extraction wells and disconnection from the gas extraction system (as directed by the U.S. EPA). The elevated concentrations of acetone, 2-butanone (methyl ethyl ketone), and 4-methyl-2-pentanone (methyl isobutyl ketone) are all estimated values and are not attributed to the modified field procedure of purging prior to sample collection since Round 4 results for vinyl chloride, total 1,2 dichloroethene, toluene, ethyl benzene, and xylenes were comparable to Round 1 and 2 GC/MS results and to Jordan (1984) leachate test results. The above anomalies could represent field or laboratory contamination as they are commonly used solvents.

Since leachate analyzed by GC/MS provided acceptable data, the results are discussed below. The leachate samples analyzed by GC/MS generally contained aromatic VOCs such as benzene, ethyl benzene, toluene and xylenes at higher concentrations than chlorinated solvents such as dichloroethene and vinyl chloride. Benzene was detected only once at 6.2B ug/l. Ethyl benzene was detected in 5 of 6 samples, with concentrations ranging from 21 ug/l to 77J ug/l, averaging 45 ug/l. (The J is a data qualifier denoting an estimated value, B denotes constituent also found in laboratory blank). Toluene was detected in all 6 samples analyzed by GC/MS and ranged in concentration from 18J ug/l to 320J ug/l, and averaged 145 ug/l. Xylenes were also found in all 6 samples analyzed by GC/MS and ranged in concentration from 80J ug/l to 300J ug/l, while averaging 170 ug/l. Tetrachloroethene was detected in only one sample (LLMHE), at a concentration of 17 ug/l. Trichloroethene was not detected in any of the samples. Total 1,2-dichloroethene was detected in 5 of 6 samples and generally ranged in concentration from 4.3 ug/l to 24 ug/l with one sample reaching 220 ug/l (LLG4), with an overall average of 46 ug/l. Vinyl chloride was also detected in 5 of 6 samples; concentrations ranged from 3 ug/l to 90 ug/l, while averaging 29 ug/l. The Jordan (1984) leachate sample results generally fell within the same concentrations (Table 2). This shows that the current leachate VOC composition is similar to the VOC makeup of leachate in 1984, indicating that the leachate has not changed significantly over this time span.



4.1.2 Semi-Volatiles

Of semi-volatiles targeted for analysis during Round 1, only 2,4 dimethylphenol (160 ug/l) and 2-methylphenol (27 to 85 ug/l) were detected. Analytical protocols require the performing laboratory to attempt to identify up to twenty non-target list compounds of greatest apparent concentration. For each of the samples analyzed, twenty such compounds were reported, however, most compounds were not identified. Those identified were primarily phenols and carboxylic acids, which are likely derived from decomposing refuse.

4.1.3 Pesticides/PCBs

The PCB Aroclor-1242 was detected in two of the first round leachate sampling locations at "estimated" concentrations of 6.9J ug/l (location LLE7) and 3.3J ug/l (location LLK2). No other pesticides/PCBs were reported as detected in leachate samples. However, the presence of Aroclor-1242 creates some uncertainty about results for other PCBs and pesticides that may co-elute (i.e., reach the detector over the same time interval as Aroclor-1242) with Aroclor-1242. If compounds co-elute, the detector responds to the presence of both compounds. If one compound is present at much higher concentration than other compounds, the ability to detect the other compounds at lower concentration at the specified method detection limits is diminished. Hence, given the presence of Aroclor-1242, it cannot be stated with complete confidence that potential co-eluting compounds are absent or at levels below their respective method detection limits. Hence, negative results for Aroclor 1016, 1221, 1232, and 1248 are qualified as estimated. Likewise, results (no detection) for the various isomers of hexachlorocyclohexane (alpha-, beta-, delta- and gamma-BHC) and those for Heptachlor, which co-elute with Aroclor-1242, are considered estimated.

4.1.4 Inorganics and Indicator Parameters

Results of most inorganics analyses are summarized in table 3 (see Appendix C for further details) and compared with typical values for sanitary landfill leachate by Cope, et al., (1983). Although Cope, et al., (1983) acknowledges considerable variability in leachate composition among landfills, their results are considered useful for comparison purposes. In general, sanitary landfill leachates have a high inorganic component. For



the most part, results of WRL analyses are within typical ranges. However, WRL leachate results do indicate higher than typical sodium and chloride concentrations. Chloride ranged from 1,160 mg/l to 17,300 mg/l. Sodium ranged from 968 to 10,200 mg/l, and potassium ranged from 710 to 1,750 mg/l. Calcium and magnesium ranged from 29.9 to 241 mg/l and 57.1 to 812 mg/l, respectively. The iron concentration ranged from 5.47 to 93.1 mg/l.

4.2 Site Geology

4.2.1 Unconsolidated Deposits

The thickness of the unconsolidated materials range from 8 feet at the Acme Solvents site (B4) to greater than 70 feet (P4R) at the western boundary of WRL (although bedrock is exposed in places at Acme Solvents (Jordan, 1984)). The body of the unconsolidated deposits thicken from east to west, forming a relatively thin, but variable mantle over the bedrock upland in the east, and filling the deep bedrock valley to the west (see Drawing 13160-2). This transition begins beneath the eastern margin of the landfill where the bedrock surface slopes downward forming the preglacial bedrock valley wall. Under the western portion of WRL, bedrock was encountered in P5 (now abandoned) at 671 feet MSL during an earlier study (Jordan, 1984). The full thickness of valley-fill sediments was not penetrated in this study, but based on regional information, the thickness is expected to be about 100 feet under Killbuck Creek near WRL. The regional bedrock surface topography map shows the elevation of the bedrock surface to be approximately 600 feet MSL under Killbuck Creek at the western margin of WRL (Figure 6).

The unconsolidated materials are dominantly sand and gravel deposits near the WRL and generally form a sequence of sand and gravel or fine to coarse sand in the lower portions of the unit and change to silt or clay near the ground surface. The uppermost silt and clay, where present, is generally 1 to 3-feet thick, but was found to be as much as 8-feet thick (G109 and G114) on the south side of the WRL. Fine-grained soil was present south of Acme Solvents at a thickness of at least 40 feet (B3) (see below). Portions of the basal sand and gravel were sometimes recognized as weathered bedrock (B7, B12, B16A, and G111). These severely degraded zones ranged from 6 to 15 feet thick. To the west, the unconsolidated sediments thicken, as they fill the bedrock valley. The soil types are dominantly fine to coarse sands with occasional fine to coarse gravel zones 11 feet (G118) to 40 feet (MW106) thick (Drawing 13160-2).



The finer grained deposits associated with the Esmond Till Member to the south of the WRL are predominantly silts and clays with occasional thin sand lenses (B14, B3, B8 and G111). Boring G111 indicates that the silts and clays are up to 24 feet thick and rest on 5-feet of fine to coarse sand with some gravel underlain by weathered bedrock (gravel with some sand) and boring B3 indicates the silt and clay interstratified with sand, are at least 40-feet thick.

4.2.2 Bedrock

The bedrock surface elevation is highly variable due to paleoerosional features. The bedrock map drawing 13160-3, is generalized based on available data. The actual bedrock surface is expected to show more variability (logs for borings SB-1 to SB-5 are included in Appendix F). To the east of the WRL is a bedrock upland. A bedrock valley begins to form under the WRL and deepens to the west (see Drawing 13160-3). The regional bedrock surface topography map illustrates the bedrock upland as a northeast-southwest trending ridge with valleys to the north and south (Figure 6). The west ends of these valleys terminate in a north-south trending valley, which slopes to the south. The full thickness of the Galena-Platteville Groups was not penetrated in this study. Regional information suggests it is expected to range from 250 feet thick in the bedrock upland (i.e. the base of the Platteville is at approximately 500 feet MSL) to less than 100 feet thick in the adjacent bedrock valley.

The bedrock near the WRL is composed of dolomite, with chert layers or nodules commonly noted throughout the dolomite. Shale partings and coatings were noted only below 695 feet MSL. The dolomite is generally fractured throughout the total depth sampled. The fractures are dominantly horizontal bedding planes, frequently cross-cut by high angle or vertical fractures. Vugs (void spaces) are consistently found throughout the dolomite, with their frequency ranging from slightly vuggy to very vuggy. Cavernous zones were not noted.



The rock quality designator (RQD) is a ratio of the total length of recovered pieces of rock core greater than 4-inches long to the total length of recovered rock core, reported as a percent. The RQD is a quantitative measure of the degree of fracturing in the sample. The RQD of dolomite core samples range widely from zero to 100 %, averaging 52.5 %, with a standard deviation of 28.9% (Appendix A). The wide variability in the RQD provides an indication of the variably fractured nature of dolomite.

A zone of up to 37 feet thick of highly fractured, soft dolomite in the near surface bedrock was encountered during drilling in previous investigations at borings B16A (Warzyn, 1985) (752-715 feet MSL), B7 (E&E, 1983) (740-715 feet MSL) and B6D (E&E, 1983) (737-732 feet MSL). The borings where the fractured zones were encountered are located in the vicinity of the northern intermittent stream, with the RQDs ranging from too soft to core to 28%. Highly fractured zones (low RQD) were also found between rocks containing few fractures (high RQD), indicating rock competence did not generally improve with depth (e.g. B12 (E&E, 1983), G109A (Warzyn, 1985), G113A, B11A (Warzyn, 1985), and B6D (E&E, 1983)).

4.3 Site Hydrogeology

4.3.1 Flow Direction

The uppermost aquifer encountered in the vicinity of the WRL changes in character due to the abrupt sloping of the bedrock surface beneath the site. East of the WRL, and below approximately its eastern quarter, the water table occurs within the dolomite bedrock. An approximately northeast-southwest line drawn from well B10 to well B13 delineates the boundary of the occurrence of the water table in bedrock vs unconsolidated sediments. From this boundary to the west, the water table occurs in unconsolidated materials. Regardless of the type of matrix material of the aquifer, the uppermost saturated unit in the immediate vicinity of the WRL is under water table conditions. The water table also occurs in the silty, clayey till to the south of the site. The sand and gravel and/or dolomite aquifer beneath the till appears to be under semi-confined conditions in the areas south of the WRL.



Groundwater flows from the uplands east of the WRL to the Killbuck Creek valley. The water table maps prepared for April 6, May 17, June 16, August 8, August 29, October 25, and November 9, 1988, and June 8, 1989, shown in drawings 13160-4 through 13160-11, respectively, depict generally similar configurations. East of the WRL, the water table appears to be a subdued expression of the bedrock topography; the water table slopes to the west, northwest, and southwest from a generally east-west trending groundwater "high" (or divide) in the vicinity of the northeast-southwest trending dolomite bedrock ridge (see Drawings 13160-3 through 13160-11). This indicates that the bedrock topography may be a factor in controlling the water table configuration where the water table occurs in the bedrock. When the water table occurs in the unconsolidated materials, the hydraulic gradient decreases and flow converges towards the Killbuck Creek floodplain to the west of WRL. Water table configurations based on 1988-1989 data are generally similar to those interpreted from ground water levels in 1985 and 1986 (see Warzyn reports in Appendix F), with regards to overall flow direction. Water levels declined from the first measurements in April 1988 to those collected in November 1988. This is consistent with the seasonal declines for the period of January 1985 to April 1986. Drought conditions during the 1988 data collection activities appear to have accentuated the decline in levels.

The presence of a groundwater mound (April 6, 1988) was the only major seasonal change in flow direction noted during 1988. The April 6, 1988 water level elevation at well B7 is greater than at any other well to the east or west on that date. A groundwater mound is simply an area which has water levels higher than those of the immediate vicinity. It is thought the mounding is due to higher localized recharge rates in this area. As discussed earlier, this area is underlain by highly weathered dolomite bedrock. The presence of periodic groundwater mounds were also noted in in previous investigations; water table maps prepared from water level data collected in 1985 and 1986 depicted a groundwater "high" or mound centered around wells B4 and B7 (Appendix F), associated with the unnamed stream in the area. In March 1985, a marked drop in flow was observed in the north unnamed stream near well B16 during heavy precipitation and high surface water runoff, indicating localized recharge to groundwater from the unnamed stream was occurring. At the culvert upstream of well nest B16/B16A, the



unnamed stream flow was estimated to be 133 cubic feet per second (59,700 gallons per minute). A marked decrease in stream flow was noted downstream of the culvert and well B16/B16A, indicating significant surface water loss to the groundwater (Appendix F, July 12, 1985 report).

4.3.2 Hydraulic Gradients

East of WRL the water table surface drops at a steeper rate than west of the facility (see Drawings 13160-4 through 13160-11). The drop in the water table surface is over a specified distance is a measurement of horizontal gradient. Horizontal gradients are controlled by a variety of factors including distance to recharge or discharge areas and the permeability of the aquifer. The ability of the aquifers to transmit water (permeability) appears to be a major component of the differences in the horizontal gradients noted in the vicinity of WRL. The higher gradients observed in the bedrock than in the sand and gravel aquifer are consistent with the higher observed permeability of the sand and gravel. The relationship between gradient, permeability and effective porosity determines the seepage velocity of the aquifer system.

The potential for vertical movement of groundwater is inferred from the potential vertical gradients. Water levels from adjacent wells screened at different depths are compared to the vertical distances separating the wells to estimate vertical gradients. Naturally occurring downward gradients are indicative of recharge areas while upward gradients indicate discharge conditions. The presence of downward gradients at a contaminant source would tend to accelerate the downward dispersion of released materials. Upward gradients at a source could limit the downward dispersion of contaminants. The presence of upward vertical gradients could indicate proximity to a discharge area and discharge of impacted groundwater into a surface water body.

Water level measurements have precision and accuracy much like any other measurement. Random inaccuracies occur when the measurement is simply recorded or taken incorrectly potentially resulting in an anomalous result. Systematic inaccuracies may result from the survey data or the measuring device. The reference point (top of



inner well casing) is surveyed to +/-0.01 ft, and the water level measurements are made to +/-0.01 ft., for an accuracy of +/-0.02 ft. When comparing the measurements from nested wells to determine vertical gradients, the accuracy is +/-0.04 ft. The combined accuracy of the measurements must be considered when comparing water level measurements of nested wells to determine if their differences are greater than the accuracy of the measurements themselves (i.e. is the difference in the water level elevations meaningful).

The water level data collected during the Phase I RI from well nests screened in the dolomite indicate the potential for complex groundwater flow in the bedrock. For example, well nests G113/G113A and G109/G109A are located near each other, but their water levels exhibit quite different behavior. The nest G113/G113A shows little potential for vertical gradients while the nest G109/G109A consistently indicates the potential for downward vertical gradients. Also, as discussed below, well nest B6S/MW105/B6D exhibits anomalous behavior which could be attributed to fracture (i.e. complex) flow in the dolomite.

Well Nest B6S/MW105/B6D. Monitoring well B6S has a 5-foot screen with approximately a 15-foot length from the bottom of the borehole to the annular seal. Well B6D has a 5-foot screen with an approximately 60-foot long sand pack (distance to annular seal from base of borehole). MW105 has a 10-foot screen with the sand pack extending only about 2-feet above the top of the screen. The water level elevations for these wells indicate MW105 (intermediate depth well) is generally equal to or greater than that for B6S (shallower well) and both of these are always greater than those of B6D (deeper well). The usefulness of the water level measurements are diminished by the long sand pack of B6D, but the anomalous water level data for these wells still indicates the potential for complex groundwater flow in the dolomite.

Well Nest B10/B10A. Water level data collected during the Phase I RI show that the water level elevation at B10A is consistently greater than that of B10. B10 is screened shallower than B10A indicating that these wells, which are both screened in the dolomite, show the potential for an upward groundwater flow component at this location.



Well Nest B11/B11A. The shallower well, B11, had water level elevations equal to or greater than that of the deeper well, B11A, based on Phase I RI data. This indicates the potential for no vertical gradient or a downward vertical gradient at this location.

Well Nest B15R/B15P. Well B15R had water level observations consistently less than those of the deeper well B15P, indicating the presence of an upward vertical gradient at this location.

Well Nest B16/B16A. The water level elevations for wells B16 (shallower well) and B16A (deeper well) show little difference in the values, indicating that the potential for vertical gradients in the vicinity of these dolomite wells is low.

Well Nest G109/G109A. The water level data collected during this RI indicates the potential for downward vertical gradients at this location since the water level elevation in the shallow dolomite well G109 is consistently higher than the deeper dolomite well, G109A.

Well Nest G113/G113A. The water level elevations for the shallow dolomite well G113 are generally about the same as that for the deeper well G113A (except in one case where G113 was higher) indicating that the potential for vertical gradients in these dolomite wells is generally low.

Well Nest G116/G116A. The water level elevations for the shallow well G116 are generally about the same, but sometimes greater than those in the deeper well G116A. This indicates that downward vertical gradients may sometimes be present, but groundwater flow in generally horizontal at these wells screened in sand and gravel west of Killbuck Creek.

<u>Well Nest B13/P6</u>. The water level elevations for these bedrock wells indicate the potential for downward vertical gradients since the water level elevations of B13 are consistently greater than that of the deeper well, P6.



Well Nest P1/MW106. Of the eight sets of water level measurements, for well nest P1-MW106, five show no measurable difference in elevations, and three indicate the potential for downward vertical gradients. One of these three measurements (11/9/88), however, is reported to be in error. According to Mr. B. Kay of the USGS the depth to water measurement was made from the outer casing instead of the inner casing (see letter dated April 13, 1989 from Mr. B. Schorle, U.S. EPA to Mr. J. Hill, Warzyn).

Well Nest P3R/P4R. The water level measurements collected for the Phase I RI indicate the potential for upward vertical gradients at this location, since the water level elevations in the deeper well, P4R, are consistently greater that those of the shallow well, P3R.

A variety of reports have noted anomalies in the water level data collected from wells in the fractured bedrock upland, indicating the complexity of flow in this dolomite aquifer including:

The Illinois State Geological Survey (ISGS) concluded that it is very difficult to monitor groundwater flow and quality in the fractured dolomite at this site because flow is primarily through the fractures and wells may be monitoring unconnected fractures (Herzog, et al., 1988) resulting in anomalies in hydraulic head and groundwater chemistry.

The USGS concluded based on their evaluation of water level elevations from both the Phase I RI and those of the Acme Solvents RI that flow in the dolomite aquifer is "extremely complex" (see letter dated 4/3/89, Mr. B. Schorle, U.S. EPA to Mr. J. Hill, Warzyn).

Hickok (1985) alluded to unexplained anomalies in water level measurements from bedrock upland wells P8/P9, B6S, and MW104 (page 2.48), resulting in "peculiar" flow patterns at depth in the dolomite. These peculiar flow patterns could be described as groundwater sinks (areas where groundwater leaves the system locally) and could be explained by zones of high permeability, if present.

Jordan (1986) stated that "... the water level in MW-202 is at about the same elevation as that in the shallow wells, and the highly fractured zone in MW-202 is obviously not in direct hydraulic connection with either B-6D or the deeper MW-201A and MW-201B. Apparently the highly fractured zone in MW-202 is hydraulically connected through fractures to the water table area near B-4". Jordan (1986) concluded that groundwater flow in the dolomite is controlled by the presence of highly fractured zones.



On a regional basis, a study by the United States Geological Survey (USGS) of a site situated over the Platteville and Galena aquifer in Ogle County, Illinois, concluded that "Movement of water in the dolomite is mainly through joints, fractures and solution openings." (Kay, et al., 1989). It was noted in a recent report concerning flow in a fractured dolomite aquifer in Door County, Wisconsin, that groundwater flow is complex and field testing located a fractured zone where groundwater flow velocities ranged up to 18 meters per day (Bradbury, et al., 1989). Flow through fractures is in some ways analogous to pipe flow. There may be a large gradient from inside to outside the pipe, but flow will only occur through the connected piping system under a perhaps lower gradient (except for leaks). Hydraulic gradients are important in determining groundwater flow, but groundwater flow paths are controlled by the permeability.

4.3.3 Hydraulic Conductivity

Table 1 lists the hydraulic conductivity results from permeability tests conducted during this investigation and the results of testing completed by E.C. Jordan (1984). The equivalent hydraulic conductivity of the dolomite bedrock ranges from 2.4×10^{-2} to 4×10^{-6} centimeters/second (cm/s) with a geometric mean of 2.5×10^{-4} cm/s. The hydraulic conductivity of the unconsolidated deposits ranges from 3.7×10^{-1} to 8×10^{-4} cm/s with a geometric mean of 7×10^{-3} cm/s. The slug tests were evaluated according to the method of Bouwer and Rice (1976). Results for both the unconsolidated deposits and the dolomite bedrock range over about three orders of magnitude, with the dolomite bedrock results tending toward lower values.

4.4 Groundwater Chemistry

Groundwater samples for the Phase I RI were collected during two sampling rounds, one during April and the other during June, 1988. Sampling locations and analytical parameter lists are described in Section 2.

4.4.1 Inorganics

As discussed earlier in Section 4.1, the WRL leachate has a high inorganic component, consistent with other solid waste landfill leachates. The inorganic components of the leachate can be used to discriminate between WRL leachate affected wells and



unaffected wells. Figure 9 is trilinear plot of the major cations calcium (Ca), magnesium (Mg), and sodium plus potassium (Na + K) (as percent of total meq/l) which are often used to discriminate between groundwater types for both groundwater and leachate samples. The WRL leachate samples plot as a Na + K rich water while upgradient or unaffected wells plot as Mg and Ca rich, forming the end points of a continuum encompassing wells apparently affected by WRL. Johnson and Cartwright (1980) used this approach and also found landfill leachate to be Na + K rich and were able to discriminate contaminated versus uncontaminated samples on this basis.

The major cation discrimination of leachate impacted groundwater is supplemented by the strong positive correlation between Na + K and the chloride ion $(r^2 = 0.998)$ (Figure 10). The chloride content of the WRL leachate is greater than typical landfill leachate (Table 3), and significantly higher than that of groundwater in the area. The near perfect correlation between chloride and Na + K, and the large chloride concentration contrast between groundwater and WRL leachate indicates that chloride can be used to discriminate between WRL leachate affected and unaffected wells. Johnson and Cartwright (1980) were also able to discriminate between leachate contaminated and uncontaminated water samples on the basis of the higher chloride content of the contaminated samples. Chloride is widely recognized as a conservative, non-reactive parameter in groundwater systems (Bently, et al., 1986; Freyberg, 1986; Wehrmann, 1983; Hem, 1989; Feth, 1981), which means it does not biodegrade or react with the aquifer matrix. The only attenuation mechanism applicable to chloride is dilution during transport. The conservative non-reactive nature of chloride coupled with the high contrast in chloride concentration between leachate and groundwater make chloride a very good "tracer" of the presence of leachate in groundwater.

Background concentrations of a specific constituent are typically determined from hydraulically upgradient or side gradient wells. Based on potentiometric data available all wells east of Lindenwood Road are upgradient as are wells B12, G109, G109A, G111, G113, and G113A located west of lindenwood Road. The range of chloride concentrations determined from these wells over time is 3 mg/l to 62 mg/l (Appendix



C). While this range may appear broad, the concentrations are significantly below the average measured chloride concentration of the leachate of 4,474 mg/l.

Inspection of figures 11 and 24 reveals two general areas where chloride concentrations appear to be elevated:

- the northwest quadrant of WRL, and
- at well G110.

At the northwest quadrant of WRL, Round 1 groundwater data for wells B15, B15R, MW106, P1 and P4R all exhibit elevated chloride concentrations (Figures 12 and 13). These are the same wells which form the continuum between WRL leachate and unaffected wells on figure 9 with respect to the Ca, Mg and Na + K cations.

Round 2 groundwater results for chlorides indicate a similar pattern at the northwest quadrant of WRL, except that well G116A showed an increase in chlorides, indicating that the WRL leachate plume has migrated west below Killbuck Creek (Figures 14 and 24).

Rough estimates of simple dilution of the average chloride concentration of leachate to the chloride concentration in groundwater samples from well G116A range from 52 times (Round 2) and 170 times (Round 1)(Table 4). Feth (1981), a review of the chemistry of chloride by the USGS, quoted Piper, et al., (1953) as follows "... only chloride probably remains chemically inert in the zones of contamination. Hence the amount of this constituent can be taken to indicate the proportion of the mixture." All other components of the leachate should at a minimum exhibit the same level of dilution as for chloride during transport to well G116A, but attenuation should be much greater for metals and organic compounds. Most metals and organic compounds are reactive and non-conservative in groundwater systems due to processes such as cation exchange, biodegradation, and/or adsorption, which tend to further reduce their concentrations in groundwater resulting in a dilution factor greater than that of chloride.



The second area exhibiting elevated chloride levels is at well G110. Samples from neighboring wells do not contain elevated chloride concentrations, indicating that the presence of leachate is quite limited (Figures 15 and 16). The chloride anomaly at well G110 has been previously attributed to surficial leachate seeps along the southern slope. More recently, it was learned that the leachate-hauling trucks were loaded near well G110 at the base of the slope. Both of these conditions could have contributed to the presence of chlorides at well G110. The seeps are currently under control and leachate is now loaded on top of the landfill.

Elevated alkalinity and depressed pH readings were noted at well B4 (at Acme Solvents) and at wells adjacent to the WRL (Figures 17 and 18). The alkalinity and pH follow a similar pattern to that for VOCs (see later discussion) along this transect. The ambient alkalinities for upland bedrock wells G102, G111, B6S, B6D, B7, B9, B16, B16A, MW104, MW105, and MW107 ranged from 238 mg/l to 344 mg/l, and for selected wells in the unconsolidated materials (B14, G117, G118A, G118R, G119, and G119A) the alkalinities ranged from 110 mg/l to 395 mg/l, indicating the alkalinity results for upland bedrock wells cover a similar range as that for unconsolidated materials wells. Alkalinity measurements typically are an indication the amount of bicarbonate/carbonate equivalents present, but may also include other titratable species. As discussed above, elevated chlorides, which are a reliable indicator of the presence of WRL leachate follow a different pattern than these geochemical anomalies. This indicates that WRL leachate is not responsible for these anomalies where elevated chlorides are not present, which is consistent with the upgradient location of these wells. Because elevated alkalinity and depressed pH are found at well B4, it becomes possible that an upgradient source may be responsible for these geochemical anomalies.

Although it has not been quantitatively determined, it is possible but not probable that the carbon dioxide portion of the landfill gas (if present) could be a potential cause for the geochemical anomalies at the landfill borders. The potential for landfill gas to be the source of the anomalies is small since a landfill gas extraction system, which retards gas migration from the site has been in place and operational since 1980. The potential for any residual influences of CO₂ on the groundwater system is extremely remote.



A comparison of metals and chloride results at individual well locations with Safe Drinking Water Act (SDWA) standards is given in table 8. Results in table 8 are the mean of observations from Rounds 1 and 2 when samples from both rounds had detectable concentrations. Barium was detected at concentrations exceeding the SDWA Primary standard of 1000 ug/l at three locations (B4-1605 ug/l; MW106-1040 ug/l; and P1-1070 ug/l). Cadmium was in excess of its SDWA Primary standard of 10 ug/l at one location (G109-16 ug/l).

The SDWA Secondary standard for chloride of 250 mg/l was exceeded in wells B15, B15R and MW106. Secondary SDWA standard for iron of 300 ug/l was exceeded at six locations (B15R, G115, MW106, P1, and P3R), and for the manganese standard of 50 ug/l was exceeded at eleven locations (B15P, B15R, G109, G109A, G114, G115, G117, MW106, P1, P3R, and P4R). SDWA Secondary standards are based on aesthetic considerations only.

Cyanide concentrations ranged from not detected to 0.494 mg/l. The U.S. EPA Ambient Water Quality Criteria (adjusted for drinking water only) for cyanide of 200 ug/l (U.S. EPA, 1986b) was exceeded only once in a sample from well G116. Since chloride results from G116 did not indicate that WRL leachate has affected it, this exceedence in not related to a release from WRL.

Most total phenol measurements were less than 25 ug/l and qualified as estimated due to the detection of total phenolics in blank samples. Total phenolic concentrations exceeded 25 ug/l at only two locations; B15 (145 ug/l) and G110 (170 ug/l), at concentrations well below the U.S. EPA Ambient Water Quality Criteria (adjusted for drinking water only) for phenol of 3,500 ug/l (U.S. EPA, 1986b).

4.4.2 Volatiles

A comparison between first and second round VOC results shows that results are generally consistent in the compounds detected and the concentrations observed between rounds. This consistency indicates that potential effects of having exceeded holding times for Round 1 samples are relatively minor. For both rounds, GC and GC/MS methods gave comparable results (Tables 5 and 6).



Results of Round 1 analyses are in many cases qualified. The main reason for these qualifiers is exceedence of holding times prior to analysis by the performing laboratory. Analyses performed after holding times were exceeded were primarily reanalyses required because of unacceptable surrogate recoveries during the initial analysis. As a guide during data validation, results were considered estimated if holding times were exceeded by less than 7 days and unusable if exceeded by greater than 7 days. A potential effect of exceeding holding times on sample results is a change in composition as a result of biological activity. This is likely to have a greater effect on aromatic compounds, which more readily undergo biodecomposition, than halogenated volatiles. As past data and data from Round 2 indicate that halogenated volatiles are the compounds of primary concern at this site, the hold time exceedence probably did not greatly affect data quality.

Analyses of Round 2 samples were performed within specified holding time limits. In a few instances, data are qualified as estimated because detector performance indicators (surrogate recoveries) showed deviations from control limits. Although deviations in surrogate recoveries were not consistent among samples, they were relatively minor (within 10% of control limits in most cases), therefore the data are generally considered to be of acceptable quality.

Figures 19 and 25 are maps of total chlorinated ethenes (PCE, TCE, DCE, VC) in the area groundwater for Round 1 and Round 2 data. The highest chlorinated ethene concentration is found at B4 on the Acme Solvents site with the second highest levels found just west of Lindenwood Road south of WRL. Both areas are upgradient of the WRL, and not associated with elevated levels of chlorides indicating WRL leachate is not the source of the VOCs. The highest concentration of VOCs are found at the Acme Solvents site, which is consistent with the disposal of large quantities of solvent wastes. Samples from private water supply wells G and H located east of Lindenwood Road (Drawing 13160-1), have exhibited significant levels of chlorinated ethenes in the past. The chlorinated ethene data compiled from various studies in Appendix C for wells G



and H shows the concentrations ranging from 48 ug/l to 224 ug/l and not detected to 582 ug/l, respectively. Measurable levels of chlorinated ethenes have been found in samples from 9 monitoring wells between the Acme Solvents site and WRL (B11, B11A, B16, B16A, B9, B6S, B6D, MW201A, and MW105) documenting the presence of VOC contamination between the sites. Five wells (B11, B11A, B16, B16A, and B6D) have shown considerably elevated levels of total chlorinated ethenes with a high of 224 ug/l at well B16. These data document the past presence of significant levels of chlorinated ethenes upgradient of the WRL between the area south of WRL and west of Lindenwood Road and well B4 at Acme Solvents.

The chlorinated ethenes form a pattern different from that of the chlorides (Figure 11 and 24). Chlorinated ethenes are found both inside and outside of the WRL leachate chloride plume, indicating that the WRL leachate plume is overprinting a pre-existing chlorinated ethene plume. For example, the Round 2 sample from G111 (22 mg/l chlorides) contained chlorinated ethenes without elevated chlorides (i.e. an area not affected WRL leachate) indicating the potential for VOCs to migrate west of Lindenwood Road.

Figure 20 is a plot of Round 2 total chlorinated ethenes along transect D-D'; a cross-section along the southern boundary of the site. Comparison with figures 15 and 16 of chloride content reveals there is no apparent relationship between the "leachate tracer" and presence of total chlorinated ethenes. Chlorinated ethenes are present both inside and outside of the zone of elevated chlorides (shaded area on figure 20). This indicates that the WRL leachate presence is overprinting a pre-existing ethene plume in this area. These plots also show that total chlorinated ethene content varies considerably with location as shown by the total chlorinated ethene results of wells G113A (532.6 ug/l) and G109A (115.1 ug/l). This irregular distribution could be the representation of preferential flow in the fractured rock, as discussed in Section 4.2.2.

Along transect C-C'; a cross-section to the north of the site, Round 2 chlorinated ethenes are present upgradient of the WRL and extend below and past WRL (Figure 21). Comparison of these plots with chloride results depicted in figures 13 and 14 reveals the presence of VOCs both inside and outside of the WRL leachate chloride plume (the



chloride plume is shaded on figure 21 for convenient review). This indicates that the WRL plume is overprinting a pre-existing ethene plume in this area. Note that well B15P has been impacted by VOCs but not chlorides, indicating the VOCs originating upgradient of WRL have traveled that far without being overprinted by WRL leachate.

VOCs are present hydraulically upgradient of the WRL and are affecting the background water quality beneath the landfill. Figure 22 depicts a total VOC plume along transect C-C' being present throughout the aquifer area studied adjacent to the WRL, and overprinted by a WRL leachate plume originating from near the center of the landfill. Figure 22 shows that total VOC pattern in the groundwater is consistent with that of total chlorinated ethene results.

A previous investigation conducted by Warzyn in 1984, found VOCs to be present in groundwater west of the landfill. In 1984, at the now abandoned well nest P3/P4/P5, chlorides were found at background concentrations and VOCs were present, indicating the landfill leachate was not the source of these VOCs detected west of the fill area (Warzyn, 1985). This indicates that a VOC plume unrelated to WRL leachate migrated west (downgradient) of WRL. The deeper well of replacement well nest P3R and P4R (i.e., P4R) installed at a location downgradient from original wells P3/P4/P5, had VOC and elevated chloride levels in both rounds of sampling in this study, indicating that the WRL plume has now overprinted the pre-existing VOC plume in this area.

Simple dilution calculations for VOCs in leachate versus groundwater are showing less dilution than a similar comparison of the chloride data (Table 4). This is not consistent with the expected relative behavior of VOCs versus chlorides, further suggesting that WRL leachate is not the source of VOCs in groundwater based on the chloride dilutions noted. VOCs present in WRL leachate should be reduced to nearly non-detectable or non-detectable levels during transport to the furthest downgradient wells. Another anomaly is the lack of TCE detected in the WRL leachate but the presence of TCE detected in many of the groundwater samples, providing additional evidence that WRL leachate is not a source of TCE or its degradation products in groundwater.



Additional evidence that WRL is not a source of VOCs comes from Hickok (1985) who reported that the correlation coefficient between total VOC content and DCE content is r = +.999 for the groundwater data from the Ecology and Environment (1983) report and the Jordan (1984) report, both of which include wells west of Lindenwood Road. This indicated that DCE content is highly related to the VOC content of groundwater rather than due to a second source as speculated by Jordan (1984). Hickok (1985) stated in their report that this implied "... in the general vicinity of the Acme site, groundwater contamination with VOCs is virtually co-definitional with groundwater contamination with DCE" (p. 1.18). Hickok (1985) added that this relationship is contradicted by the sparse detection of DCE in test pit samples from the Acme Solvents site reported in the Jordan (1984) study as follows:

Acme Solvents Site				
Test Pit Samples	DCE (ug/kg)	Total VOC Content (ug/kg)		
1 S-4	2,500	143,800		
4 S-3	3,200	1,140,800		
4 S-5 5 S-3	20,000 69	1,412,000 3,583		

The DCE detected in groundwater samples may also be a result of biodegradation, either in source area soil in the vadose zone prior to reaching the groundwater or in the groundwater, so it is perhaps more important to note that the assumed parent compounds (PCE, TCE) were found in measurable concentrations in all but three of the fifteen test pits (pits 11, 13 and 14). And as shown above, the total VOC content for the selected test pit samples ranged from 3,583 ug/kg to 1,412,000 ug/kg. Viewed in this context, the above Acme Solvents test pit soil results are not in conflict with the groundwater results since the total VOC content was relatively high, parent compounds were widely detected in test pit samples, and DCE, when detected, was relatively high in concentration in test pit samples.

VOCs detected in groundwater other than chlorinated ethenes or ethanes were in most cases observed at relatively low concentration (<10 ug/l). An exception was methylene chloride, which was observed at several first round locations at concentrations ranging from 10 to 20 ug/l. However, first round blanks also had methylene chloride at about 20



ug/l, so results are likely due to sample contamination. Other VOCs detected at concentrations greater than 10 ug/l include: 1,4-dichlorobenzene (B12-18J to 22 ug/l, B13-11 ug/l; B15-13 to 16 ug/l; G114-45 to 63 ug/l); 1,2-dichloropropane (B12-11 ug/l; B13-10 ug/l; G114-11 ug/l); chloroform (B13-11 ug/l); benzene (G110-15 to 17 ug/l); and 1,1,2,2- tetrachloroethene (G109A-19 ug/l). (Note: 1,4 dichlorobenzene is a target VOC for analyses by GC using Hazleton's method. It is also a target analyte for semi-volatiles analyses using CLP protocols). In addition to chlorinated ethenes and ethanes, xylenes (34 ug/l) were also detected at location B4.

Factors which may be playing a role in the apparent distribution of VOCs in the groundwater are:

- 1) Intermittent and spatially variable recharge could break up the VOC plume as modeled by Jordan (1984);
- 2) Biodegradation may alter the pattern of VOCs in the groundwater;
- 3) The pattern of VOCs may be an artifact of the current well placement in a fracture flow dominated aquifer (i.e., a higher density of wells is present in the area just west of Lindenwood Road south of WRL, increasing the chances of intercepting a VOC-containing fracture (Figure 1); or
- 4) A second source of VOCs.

Intermittent and Spatially Variable Recharge

The apparent bimodal distribution of VOCs in the area groundwater could be the result of intermittent and spatially variable recharge. As discussed in Section 4.4.1, the upland area east of the WRL receives excess groundwater recharge along the intermittent stream during precipitation and associated runoff events. The recharge noted could complicate the groundwater VOC chemistry by locally introducing relatively clean water into the dolomite aquifer. Computer modelling by E.C. Jordan (1984) indicates that such recharge could produce the VOC pattern currently observed.

A second aspect of the influence of variable recharge are waste disposal practices used at Acme Solvents. The pattern of VOCs in groundwater could be related to the pattern of disposal over time and location. Waste volumes, type, and disposal location varied over



the operating life of Acme Solvents, and in 1986, much of the remaining waste material at Acme Solvents was removed.

Figure 23 is a plot of total concentration of VOCs over time for selected wells north, south and east of WRL. In these selected wells, VOC concentrations generally decreased from the beginning of data collection in 1982 until May 1984. After which, VOC concentrations increased to a maximum in January 1985 and continued to decrease to April 1988. Of these selected wells, the well with the highest VOC content has shifted downgradient from B12 to B13. These trends are consistent with the interpretation of a passing slug of groundwater with higher VOC concentrations. Samples from piezometers B16A, B10A and B11A did not show this effect indicating that this trend is not due to bias associated with variation in sampling or analytical procedures.

Biodegradation

A previous study of Acme Solvents and WRL as part of the NPL listing process noted a bimodal distribution of organic compounds in the groundwater in the area (Jordan, 1984). It appeared that the relative amount of trans-1,2-dichloroethene under WRL was greater than under the Acme Solvents site. EPA methods typically used to analyze groundwater samples for VOCs do not differentiate between the cis- and trans-isomers of 1,2-dichloroethene (1,2-DCE) and the results are reported as the trans-isomer (Cline and Viste, 1985). Subsequent testing has shown cis-1,2-DCE to be the dominant isomer present in the area groundwater. The differentiation of isomers is important to the interpretation of the VOC transport in groundwater, since the presence of cis-isomer of 1,2-DCE is indicative of biologically mediated degradation of more chlorinated parent species. Wood, et al. (1981) determined that biodegradation of trichloroethane produces dominantly the cis-isomer of 1,2-DCE with traces of the trans-isomer as well.

Vinyl chloride (VC), 1,1-dichloroethene, cis- and trans-1,2-dichloroethene, 1,1-dichloroethane and chloroethane are either not commercially produced or are not in wide use (i.e., used in specialized industries) as are parent compounds such as tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane and methylene



chloride (Wood, et al., 1981), which further suggests that the presence of less chlorinated compounds in groundwater may be due to a degradation process. Biodegradation of chlorinated ethenes and ethanes in groundwater occurs under anaerobic conditions through the loss of a chlorine atom (Vogel, et al., 1987). Wood, et al., (1981) and Vogel and McCarty (1985) found PCE to degrade to TCE, then to DCE and finally to VC. Studies by Wilson, et al., (1986) and Barrio-Lage, et al., (1986) additionally determined that the cis-isomer of DCE degraded to chloroethane as well as VC.

The percent of an individual ethene to the total concentration of ethenes provides a gauge as to the relative level of degradation present. Dolomite wells east of Lindenwood Road generally have the highest percentage of PCE, while unconsolidated material wells and dolomite wells west of Lindenwood Road tend to have the highest percentages of VC, with no clear distinctions for TCE and DCE (Table 7). In addition, nearly all the DCE detected in Round 1 and Round 2 samples was the cis-isomer. The decrease in PCE as a percentage of total ethenes, the increase in VC as a percentage of total ethenes, and the dominance of the cis-isomer of DCE suggest that biodegradation of chlorinated ethenes may be occurring and playing a role in the distribution of VOCs in the groundwater.

Artifact of Well Placement

Another factor contributing to the appearance of an apparent bimodal distribution of VOCs in the groundwater upgradient of WRL is an artifact of monitoring well placement, both horizontally and vertically. Since the closest well nest (B6S, B6D, and MW105) to well B4 at the Acme site has not intercepted a VOC plume with concentrations expected of a solvent waste disposal site situated directly on fractured dolomite, it appears that the existing monitoring well system has not defined the extent of VOC presence in the dolomite aquifer on the Acme Solvents site near well B4. Well B4 has historically had the highest concentration of VOC of any project wells. Only MW202, located near well B4 at the Acme Solvents site, has intercepted groundwater with high concentrations of VOCs (3070 ug/l-Table 2, Jordan, 1986).



The following discussion illustrates how vertical placement of the well intake and seal depth can influence the "apparent" distribution of VOCs when plotted horizontally on a map. As previously noted in Section 4, fractured dolomite is difficult to monitor since flow is dominantly through fractures. A "highly fractured zone" is reported by Jordan (1986) at about 650 to 655 ft. MSL in MW202. B6S and B6D are screened above this zone and MW201A and MW201B, located close to wells B6S and B6D, are screened much below this zone. All of these wells appear to contain low concentrations of VOCs. MW202, which is screened in the highly fractured zone, has VOCs at concentrations similar to that of well B4 which has had the highest concentration of VOCs of any monitoring well. Well B6D, is reportedly screened just into or above this highly fractured zone. [Note that the boring log for B6D does not note that a highly fractured zone was encountered (E&E, 1982).] Given the long effective screen interval of well B6D (60 feet), a sample from this well may not be representative of the groundwater quality at the well base, and VOC results could be biased low if upper zones of the dolomite intersected by the effective interval were less contaminated by VOCs (i.e., the sample gets diluted). Results from shallower wells B6S and MW105 do shown VOCs at concentrations substantially less than that detected in MW202. For example, had well G113A been constructed similarly to B6D, the VOC results would probably be much lower in concentration.

Well B9 also contributes to the misconception that groundwater between Acme Solvents and WRL are not impacted by VOCs. VOCs have only been found in well B9 in January 1985 at a total VOC concentration of 0.8 ug/l (Warzyn, 1985). Well B9 is a water table well screened significantly above the fracture zone found in well MW202, but when plotted on a map gives the "appearance" that VOCs are not present at this location. In reality, monitoring well B9 provides no information concerning the water quality at depth. B9 is the only dolomite well south of STI-5I and STI-5D and between Lindenwood Road and west of nest B6S/B6D/MW105/MW201A/MW201B.

Well B7 is a water table well located west (i.e., downgradient) of the north intermittent creek. Groundwater quality in this area as represented by samples from B7 could be affected by dilution from recharge from the north intermittent stream.



Well nest B16/B16A is located north of the water table "ridge" (or divide) as shown on the potentiometric maps (see Drawings 13160-4 to 13160-11) and could potentially be out of direct line from the assumed source areas (see Jordan, 1984) at Acme Solvents. The deepest well B16A is screened at a shallower depth than the highly fractured zone at MW202, and could miss a "potentially" dominant flow path in the fractured rock.

Well nest STI-5I/STI-5D was installed in June of 1988 according to information contained in a letter dated June 30, 1989 from Mr. B. Schorle (U.S. EPA) to Mr. Hill (Warzyn). Inspection of the preliminary logs indicate that the boreholes were drilled using air rotary which could have stripped any VOCs present in the area of the borehole (note that air circulation was lost completely from the 121 to 180-foot interval). The effective screen interval of STI-5I is 20 feet which could lead to dilution of the sample (U.S. EPA, 1986a). The boring log for STI-5D also indicated the presence of an oil film on the surface of the formation water fifteen feet above the top of the completion zone of STI-5I (according to the boring log of STI-5D) suggesting the presence of a contaminated zone above the completion interval. This well nest may also be north of the main plume as indicated by increases in VOC content in a southerly direction from B11A to G109A to G113A.

As discussed earlier, VOCs are present in the groundwater between the two sites, but the existing upgradient groundwater monitoring system has not adequately characterized the VOC groundwater plume from Acme Solvents. The above discussion points out that the apparent bimodal distribution of VOCs may merely be a artifact of upgradient well placement, both horizontally and vertically. The paucity of optimally located and constructed monitoring wells between the sites defining the extent of upgradient VOC contamination contribute to the misconception that groundwater between the Acme Solvents site at well B4 and Lindenwood Road has not been affected by VOCs. Groundwater chemistry should be interpreted in light of the well location, (both horizontally and vertically), and well installation and design aspects.



Second Source

Another possible alternative to explain the observed VOC distribution is a second source of VOCs. Warzyn (1985) noted the possibility that the high nitrates detected at private well G could indicate the presence of septic wastes and animal carcass wastes. It has been shown that household septic systems do contain chlorinated VOCs (DeWalle, et al., 1985) and that septic systems have the potential to pollute groundwater (Wehrmann, 1983). The issue of landfill gas migration as a source has been raised, but is not considered a viable alternative because:

- a previous study found landfill gas to be migrating off-site but migration was found only in highly permeable unsaturated soils above the bedrock, indicating that the gas was not in contact with the groundwater table present in bedrock (Warzyn, 1980);
- a gas extraction system has been in operation since 1980 controlling the landfill gas;
- the WRL leachate contains lower concentrations of VOCs than the groundwater samples from wells southeast of the WRL, indicating that it is unlikely that significant amounts of VOCs could be or were in the landfill gas; and
- the WRL generally accepted municipal waste with limited quantities of Illinois Special Wastes (WRL, 1984), and so would not be expected to be able to release significant amounts of VOCs like a solvent disposal site might.

4.4.3 Semi-Volatiles

Results of analyses of groundwater samples for semi-volatiles are generally considered to be of acceptable quality. In two instances, target compounds were detected at concentrations above detection limits. In both cases, the compound was 1,4-dichlorobenzene (B15-11 ug/l and MW106-12 ug/l). Tentatively identified compounds (TICs) were detected at both B15 and B15R. These compounds were estimated to be present at relatively low concentrations (<50 ug/l). Those identified were primarily phenols and carboxylic acids.

4.4.4 Pesticides/PCBs

Results of pesticide and PCB analyses showed no target compounds at detectable levels.



4.5 Surface Water and Sediment Analyses

Surface water (SW) and sediment (SD) samples were collected at five locations along Killbuck Creek during Round 1 sampling (see Drawing 13160-1). Four of the sampling locations are downstream of the landfill (SW1 through SW4 and SD1 through SD4). The furthest upstream location is considered to represent background conditions (SW5 and SD5).

4.5.1 Inorganics - Indicators

a. Surface Water

Surface water samples were analyzed for field pH, field specific conductance, phenols, chloride, alkalinity, arsenic, barium, and cadmium. Results for pH showed no upstream-downstream trends, but rather showed little variation, ranging from 7.81 to 7.89. Similarly for specific conductance results, no upstream-downstream trends were noted as the results were relatively constant, ranging from 570 umhos/cm to 620 umhos/cm. Alkalinity results ranged from 186 mg/l to 217 mg/l. Chloride concentrations ranged from 25 mg/l to 27 mg/l. Again, no upstream-downstream trends were noted in either the alkalinity or chloride results.

Arsenic was not detected in any of the samples. Cadmium was detected only in sample SW1 at 0.8 ug/l. Barium was detected in all samples at concentrations ranging from 70 ug/l to 80 ug/l. No upstream-downstream trends were noted in the barium results. Both barium and arsenic concentrations found are significantly below the Interim Primary Drinking Water Standards of 10 ug/l and 1000 ug/l respectively. Phenols were detected only in SW3 and SW5 (upstream background sample) at 9 ug/l and 7 ug/l, respectively. The concentration of phenols in SW3 is similar to that of the background sample (SW5) and appear to reflect ambient conditions.

The USGS maintains a surface water monitoring station on Killbuck Creek downstream from the WRL at the bridge on State Highway 251 (Figure 1). For the period from October 28, 1987 to September 15, 1988, nine samples were collected and instantaneous discharge of the stream recorded. The samples were tested for a variety of parameters including pH, specific conductance, hardness, calcium, magnesium, sodium, barium, and manganese (Appendix G). The parameter concentrations showed little correlation to



the discharge rate of the stream. The pH, specific conductance and barium concentrations were similar in value to the results of the samples of this study.

Since upstream-downstream trends in the results are not evident in the surface water samples from this study, WRL does not appear to be impacting the water quality of Killbuck Creek. In addition, comparison of the data from this investigation to the USGS data indicates that this conclusion is valid at other stream flow discharges, since the parameter concentrations (USGS data) do not vary with discharge.

b. Sediments

Sediment samples were analyzed for 23 metals and cyanide. The results do not exhibit any upstream-downstream trends and downstream sample concentrations are generally comparable to those of the background sample SD5. The sediment results for metals are also at or below the mean values for soils reported by Connor, Shacklette and others (1975), except for calcium and magnesium as would be expected due to the presence of dolomite bedrock at this site. Connor, Shacklette and others (1975) conducted a study to determine the "large scale" or "ordinary" natural geochemical variation in rocks, soils and plants in the conterminous United States. Since upstream-downstream trends are not evident and sediment concentrations of downstream samples are comparable to both the background sample (SD5) and reported values (Connor, Shacklette, et al. 1975), WRL has not impacted the sediments in Killbuck Creek.

4.5.2 Volatiles

a. Surface Water

Results of analyses indicate that VOCs are not likely present in stream waters or sediments at measurable levels. Results for surface water at location SW1 showed methylene chloride at 19 ug/l. Methylene chloride was also detected in the field blank (FB03) at 20 ug/l. Methylene chloride is a typical field/laboratory contaminant, which is likely to account for this result. VOCs were not detected in sample SW2, but the SW2 GC/MS confirmation sample contained 0.29 ug/l of chloroform. The only other surface water sample having measurable VOCs was collected at location SW3, where 5 VOCs at



low concentration (within 1 to 3 ug/l of their detection limits) were detected. However, a duplicate sample collected at SW3 had no detectable VOCs. The field blank (FB04) shows two VOCs at low concentrations. Because the detection of VOCs was not duplicated and VOCs were present in the field blanks, these results probably reflect field/laboratory contamination.

b. Sediments

Results of VOC analyses for sediment samples indicated chloroform may be present in two of the five samples at low concentrations (2 ug/kg). However, results are below method detection limits (i.e., the level of lowest numerical quantification) and are considered estimated. No other VOCs were detected. Although not detected, results for aromatic compounds are qualified as estimated. This qualification was necessary because sample holding time prior to analysis exceeded the seven day period specified in the QAPP by 3 to 4 days. It is possible, but not probable since the holding time exceedences were small, that biodecomposition could reduce concentrations of aromatics in the samples. But, because of this possibility and because holding times were exceeded, the negative results for aromatics are qualified as estimated.

4.5.3 Semi-Volatiles

Semi-volatiles (SVOCs) analyses were performed on sediment samples. Except for sample SD5, only phthalates (bis(2-ethylhexyl)phthalate and di-n- butylphthalate) were detected. Phthalates tend to be ubiquitous due to their widespread use as plasticizers. At the upstream location SD5, several polycyclic aromatic hydrocarbons (PAHs) were detected at low concentrations (less than method detection limits).

4.5.4 Pesticides/PCBs

No pesticides or PCBs were detected in sediments.



SECTION 5 SUMMARY AND RECOMMENDATIONS

5.1 Summary

The primary focus of the Phase I RI is to determine if the WRL is impacting the groundwater system. On the basis of available data, it has been determined that two distinct groundwater plumes exist. The WRL leachate plume is distinguished by its elevated chloride content, while the pre-existing VOC plume is distinguished by the absence of elevated chloride levels. Based on this analysis, the VOC plume was present downgradient of the western boundary of the WRL as early as 1984, at a location where the WRL plume was absent. The high inorganic character of the leachate and the conservative, non-reactive nature of the chloride ion play an important role in the analysis.

The groundwater flow direction is generally from east to west, making WRL downgradient of the inactive Acme Solvents site. Given the high concentrations of VOCs detected in groundwater monitoring wells adjacent to Acme Solvents (B4 and MW202) and the reported placement of large quantities of liquid wastes containing VOCs on the Acme Solvents site in areas without viable containment, it appears Acme Solvents has released large quantities of VOCs to the groundwater system. The extent of releases from Acme Solvents have not been adequately defined by the existing monitoring network downgradient of Acme Solvents and upgradient of WRL. Preferential flow through fractures has masked the release downgradient from Acme Solvents in the dolomite aquifer. Results of this study have documented that VOCs have affected the WRL background water quality and that the apparent distribution of VOCs in the fractured dolomite aquifer may be complicated by many factors such as:

- 1) Intermittent and spatially variable recharge could break up the Acme Solvents VOC plume;
- 2) Biodegradation may alter the pattern of VOCs in the groundwater;
- 3) The pattern of VOCs may be an artifact of the current well placement in a fracture flow dominated aquifer between the two sites; and
- 4) A second source of VOCs.



The issue of landfill gas migration as a source has been raised, but is not considered a viable alternative because:

- A previous study found landfill gas to be migrating off-site but migration was found only in highly permeable unsaturated soils above the bedrock, indicating that the gas was not in contact with the groundwater table present in bedrock (Warzyn, 1980);
- A gas extraction system has been in operation since 1980 controlling the landfill gas;
- The WRL leachate contains lower concentrations of VOCs than the groundwater samples from wells southeast of the WRL, indicating that it is unlikely that significant amounts of VOCs could be or were in the landfill gas; and
- The WRL generally accepted municipal waste with limited quantities of Illinois Special Wastes (WRL, 1984), and so would not be expected to be able to release significant amounts of VOCs like a solvent disposal site might.

The WRL leachate plume begins at about the center of the landfill at well B15R on the north side and extends west with elevated chloride concentrations being noted at the furthest downgradient well G116A underflowing Killbuck Creek. Samples from wells to the north including G117, G118R, G118A, G119, and G119A do not contain elevated levels of chloride. Elevated chlorides were noted at well P4R, but not at well G115 at the southern boundary of WRL. Within the WRL plume, the SDWA Primary Drinking Water Standards were only exceeded for barium at well MW106 and P1. Within this plume, the SDWA Secondary standard was exceeded for chloride at wells B15, B15R, and MW106; for iron at MW106 and P1, and for manganese at B15R, MW106, P1, B3R, and P4R. SDWA Secondary standards are based on aesthetic considerations only. The presence of elevated chlorides further downgradient than metals is attributed to attenuation of the non-conservative, reactive metals.

The chlorinated solvents detected in wells within the WRL leachate plume are thought to be the results of upgradient (background) influences not related to WRL. Other VOCs which could potentially be attributed to WRL leachate that are designated in Table 302.4 of 40 CFR Part 302.4 as the hazardous substances list (HSL) are 1,2-dichloropropane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chlorobenzene, benzene,



xylenes and toluene. None of these were present in samples from the furthest downgradient well G116A, indicating that these constituents are being attenuated to non-detectable levels at G116A.

5.2 Recommendations for Phase II

The evaluation of analytical results from groundwater samples indicates the existing monitoring well network is adequate to define the extent of releases of hazardous substances from the WRL. Thus, additional monitoring well installation is not recommended. Phase II investigative efforts should focus on the following:

- Round 5 leachate samples should be analyzed for VOCs, SVOCs, Pesticides/PCBs, 23 metals plus hexavalent chromium, phenolics, chloride, alkalinity, cyanide, field pH and field specific conductance. Round 5 leachate samples should be analyzed for organics using GC/MS methodologies to improve data quality. Detection of a PCB in two samples in previous rounds, and the resulting questions on analytical response requires additional testing. The landfill gas collection headers will be disconnected and leachate purged 24 hours prior to collection of the samples. Gas well D1 will be sampled to verify that the acetone found was due to lab/field contamination. The other leachate sampling points will be gas wells E3, N8, L2, and the east and west manholes.
- Wells with elevated chloride concentrations and those which are located immediately adjacent to the landfill, should be sampled during Rounds 3 and 4. Monitoring wells to be sampled include B13, B15R, B15P, G109, G019A, G110, G111, G114, G115, G116, G116A, P1, P3R, P4R, and P6.
- Round 3 groundwater samples should be analyzed for VOCs by GC/MS (since the dominant presence of the cis-isomer of 1,2 dichloroethene has been documented, the standard CLP-type protocol can be used), SVOCs, arsenic, barium, cadmium, hexavalent chromium, total chromium, phenolics, chloride, alkalinity, cyanide, field pH, and field specific conductance. This will provide additional documentation that the few HSL compounds, which are not chlorinated solvents, currently detected adjacent and downgradient from the WRL are rapidly being attenuated. Samples will also be analyzed for the standard water chemistry parameters sulfate and nitrate. Round 4 groundwater parameters will include VOCs (by GC/MS), arsenic, barium, cadmium, hexavalent and total chromium, phenolics, chloride, alkalinity, cyanide, field pH, and field specific conductance unless results from Round 5 leachate sampling indicate additional parameters are warranted.



- Water level monitoring should continue on a monthly basis for a 6-month period. Three staff gages should be installed in Killbuck Creek and be included as part of the monthly water level monitoring program. The additional water level monitoring is needed due to the complex nature of groundwater flow. The collection of water levels from the creek is necessary to verify that the creek is acting as a groundwater discharge zone.
- · Plug and abandon well P7 since it is reported to be damaged.
- Perform 12 additional single-well field permeability tests at B9, B10, B10A, B12, B13, G108, G109A, G110, G113, G113A, G114 and P6, to gain more information on the variability in the permeability of dolomite.



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TABLE 1
HYDRAULIC CONDUCTIVITY TEST RESULTS

Warzyn Results 1988 Bedrock cm/s		September 1984 E.C. Jordan Results cm/s			
B11	1 × 10 ⁻³	MW-105	1 x 10 ⁻⁴		
B11A	1.2×10^{-4}	MW-107	4.4×10^{-5}		
B15P	5.4×10^{-4}	P-8	3×10^{-4}		
B16	8.2×10^{-4}	P-9	1.5×10^{-4}		
B16A	1.6×10^{-4}				
G109	3.2×10^{-4}				
G109A	4×10^{-6}				
G111	2.4×10^{-2}				

Bedrock Geometric mean = 2.5×10^{-4} cm/sec

Unconsolidated Sediments cm/s

Unconsolidated Geometric mean = 7×10^{-3} cm/sec

Geometric Mean¹ = exp
$$(\frac{1}{n} (\ln(x_1) + \ln(x_2) + \dots + \ln(x_n))$$

1. (Sudicky, 1986; Gilbert, 1987)

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TABLE 2 RESULTS OF LEACHATE ANALYSES FOR VOLATILE ORGANICS BY GC/MS (ug/l)

	LLMHW 4/8/88 Round 1	LLG7 6/16/88 <u>Round 2</u>	LLD1 6/8/89 Round 4	LLD1-DUP 6/8/89 Round 4	LLF7 6/8/89 Round 4	LLG4 6/8/89 Round 4	LLMHE 6/8/89 Round 4	Leach 1 5/84 (Jordan, 19	Leach 2 5/84 84)(Jordan, 1984)
Vinyl Chloride	12	90	54	55	12		3		••
Total 1,2-Dichloroethene	4.3	24	21	22		220D	6	0.9	15
Tetrachloroethene	••	••	••			17	••		
Benzene	••	6.2B							4.4
Toluene	67B	2708	320JE	310JE	47J	150J	18J	5.4	260
Ethyl Benzene	21	568	49J	49J	65J	77J			16
Xylenes	89	1308	190JX	170JX	230JX	3001X	80JX		76
Chloroform	16		••		••			••	
Chloromethane	••		2J	31			• •	••	
Chloroethane			10	11			• •		
Methylene Chloride			138	10B		••			44
Acetone	••		14000JBD	18000JBD	76J				
1,1-dichloroethane	••	••	53	57					7.0
2-butanone	••	••	22000JD	20000JD	26J	22JD		••	
1,2-dichloropropane	••	••	31	3J	••			••	
4-methyl-2-pentanone	• •		1,6000J	1,400DJ					
2-hexanone	••	••	240JE	260JE		65	••		

Notes:

B = Also noted in laboratory method blank
J = Estimated value
--- = Not detected
D = Diluted example
E = Exceeded calibration range
X = Manually quantified

V160R08JAH

TABLE 3

Comparison of Results of Leachate Analyses with Reported Values for Sanitary Landfill Leachate

<u>Parameter</u>	WRL Observed Range	Typical Values*
pH (standard units) Specific conductance (umhos/cm) Alkalinity (mg/L) Chloride (mg/L)	6.63 - 7.95 6,520 - >50,000 2,600 - 13,100 1,160 - 17,300	5 - 8 NR 1,000 - 10,000 100 - 3,000
Sodium (mg/L) Calcium (mg/L) Magnesium (mg/L) Potassium (mg/L) Iron (mg/L)	968 - 10,200 29.9 - 241 57.1 - 812 710 - 1,750 5.47 - 93.1	200 - 2,000 200 - 3,000 50 - 1,500 200 - 2,000 50 - 600
Lead (ug/L) Copper (ug/L) Zinc (ug/L) Chromium (ug/L) Cadmium (ug/L) Arsenic (ug/L) Nickel (ug/L) Barium (ug/L) Selenium (ug/L) Mercury (ug/L) Cyanide (mg/L)	26 - 258 ND - 5,720 268 - 6,690 278 - 601 ND - 226 8 - 240 323 - 782 78 - 4,710 ND ND - 0.8 0.04 - 6.0	20 - 300 45 - 300 28,000 - 30,000 120 250 110 - 160 600 - 1,050 NR NR NR NR

* after Cope, et al., 1983 ND not detected NR not reported

Table 4
Table of Dilution Factors(a)

Round	<u>Well</u>	(A) Chloride <u>Dilution</u>	(B) Ethenes VOC dilution without Background
1	B15	6.5	132
	B15R	8.7	2.4
	B15P	neg(b)	3.5
	P1	17.8	5.4
	MW106	9.8	3.1
	G116	neg(b)	undefined(b)
	G116A	170	5.3
2	B15	4.6	24.7
	B15R	12.5	2.9
	B15P	undefined(b)	4.1
	P1	26.7	2.6
	MW016	11.3	2.6
	G116	neg(b)	undefined(b)
	G116A	52.2	1.8

- (a) Chloride dilution factors represent a rough estimate of the potential dilution of WRL leachate at a given well location adjusted for background. Ethene dilution factors are a similar representation of leachate dilution at a given well for ethenes without consideration of background. Because chloride is a conservative parameter, and ethenes are a non-conservative parameter, the ethene dilution factor is expected to be greater than or equal to the chloride dilution factor if WRL leachate were the source of ethenes.
- (b) A negative or undefined indicates that it is mathematically impossible to dilute the leachate to a concentration lower than the given background value (i.e. background is greater than the downgradient well result).
- A = (Concentration in Well) (Average Leachate Concentration (4.480 mg/l Cl) (Background Concentration) (Concentration Measured in Well)
- B = (Concentration in Well) (Average Leachate Concentration (77.2 ug/l VOC) (Concentration in Well)

V160R08JAH

TABLE 5 COMPARISON OF GC AND GC/MS ANALYSIS RESULTS FOR VOLATILES IN ROUND 1 GROUNDWATER SAMPLES (ug/1)

	B11		B16		G107		G119	
	CC	GC/MS	GC/MS	GC	GC	GC/MS	GC	GC/MS
				uç	g/L			
1,1-Dichloroethene								
1,1-Dichloroethane			1.10	0.87J				
*1,2-Dichloroethene	0.59	0.47	25.3	23.0	1.94 J	1.50		
1,1,1-Trichloroethane	0.38		2.70	3.25	0.45 J	0.42 J		
Trichloroethene		0.27	2.50	2.76	0.27 J	0.42		
Tetrachloroethene	1.06	1.00	2.10	1.78		0.46		
Chloroform			0.37					
trans-1,3-Dichloropropane			0.66					

^{*} Total for GC/MS and cis-1,2-Dichloroethene for GC analyses -- Not detected

V160R01JAH

J Concentrations are considered estimated

TABLE 6 COMPARISON OF GC AND GC/MS ANALYSIS RESULTS FOR VOLATILES IN ROUND 2 GROUND WATER SAMPLES (ug/1)

	G115		<u>G119A</u>		B11A		89	
	GC	GC/MS	GC	GC/MS	GC	GC/MS	GC	GC/MS
				ug/l				
Vinyl Chloride	16	2.4				~~		
Chloroethane	30	6.7			1.5 J			
1,1-Dichloroethene	0.39			0.11 J				
1,1-Dichloroethane	2.6	1.7		0.14 J	2.0 J	1.80		
1,2-Dichloroethene*	6.6	2.6	1.10	1.20	8.2 J	5.60		
1,1,1 - Trichloroethane			0.37	0.57 J	0.70 J	0.94		
Carbon tetrachloride	8.0							
1,2 - Dichloropropane	0.67	0.65						
Trichloroethene		0.16 J	0.47	0.76	2.60	1.80		
Benzene	0.51	1.10						
Chlorobenzene		0.68						
Ethylbenzene	0.28							
1,4 - Dichlorobenzene	3.10							
Tetrachloroethene				0.48 B	5.6	J 4.5 B		

^{*} Total for GC/MS and cis-1,2 - Dichloroethene for GC analyses -- Not detected
J concentrations are considered estimated
B also noted in laboratory method blank

V106R01JAH

TABLE 7

The Distribution of Chlorinated Ethenes as a Percent of Total Chlorinated Ethenes in Selected Groundwater Samples Round 2

	<u>PCE</u>	TCE	DCE	<u>vc</u>
Dolomite	Wells	East of Lin	denwood	Road
B4 B16 B16A B11A G108	42.3 12.0 5.0 34.1 32.5	18.3 14.3 5.5 15.9 23.1	39.3 73.7 89.5 50.0 43.1	0.1 0.0 0.0 0.0 1.3
<u>Dolomite</u>	Wells	West of Lin	denwood	Road
B12 G109 G109A G113 G113A G111 G114 G110 B13 P6	5.7 18.3 6.6 22.0 14.1 16.6 0.0 2.0 8.2 19.4	6.6 5.9 26.1 4.6 30.0 11.6 7.4 7.6 15.3 22.5	80.2 55.9 59.1 63.4 53.4 71.8 42.4 13.0 72.0 58.1	7.5 19.9 8.3 10.0 2.5 0.0 50.2 77.4 4.5 0.0
<u>Unconsol</u>	<u>idated</u>	Material We	<u>11s</u>	
B15R G115 P3R P4R MW106 P1 G116 G116A	8.1 0.0 0.0 15.7 3.6 0.0 0.0	23.2 0.0 13.2 15.7 31.6 16.7 0.0 14.9	52.6 29.2 71.2 66.5 50.2 62.9 0.0 65.5	16.1 70.8 15.6 2.0 14.6 20.4 0.0

TABLE 8 SUMMARY OF SELECTED INORGANICS ANALYSES COMPARED TO SDWA STANDARDS (mg/l)

		F1 1000	ery Stand							lary Stand			
As	8a	Cd	Cr	Pb	Hg	Se	Ag	Cu	<u>fe</u>	Mn	Zn	Cl	
0.050	4 00	0.010	0.050	0.050	0.002	0.010	0.050 mg/		0.300	0.050	5.00	250	
0.050	1.00	0.010	0.050	0.050	Ų.UUZ	0.010	0.050	1.00	0.300	0.050	5.00	250	
0.045	0.761	0.045	0.480	0.129	0.0008		0.006	1.963	24.6	0.537	1.783	4474	
	0.035	0.0004										16	
	0.034	0.0008										6	
	0.045	0.0017										10 5	
	0.037	0.0010										5	
	0.192											24	
	0.183											30	
	0.041	0.0003				-						11	
0.033	0.528								3.53	0.041	0.967	735	
	0.052									0.059 *	1.45	15	
0.033 BN	0.973	0.0080 *							0.497 *	1.23 *	1.97	413	
	0.060	0.0010										18	
	0.029	0.0011										17	
0.011	1.605	0.0007										9	
	0.026	0.0009										11	
	0.037	0.0007										25 25	
	0.056	0.0004										18	
	0.034	0.0003		0.007					0.191 *	0.191 *	5.34	28	
	0.180			0.007					0.191 -	0.171 -	7.34	10	
0.002 BM	0.055 0.236	0.0005					0.002		0.109 *	0.188 *	6.34	61	
0.002 BN 0.013	0.756	0.0006					0.002		0.109 "	0.100 -	0.34	200	
0.013	0.738	0.0004										22	
	0.21 8 0.105	0.0005										32	
	0.165	0.0009										30	
	0.148	0.0007										30 29	
0.020	0.944	3.0007										43	
0.030	0.332 J								11.00 *	2.01 *	0.211	44	
0.030	0.050							0.122 N	.1.00	2.01	V. L . I	77	
	0.225 B			0.006				V. 122 M				70	
	0.068			5.00						0.065	0.657	27	
	0.467	0.0004								J. 00.J	0.031	33	
	0.032	3.0004									0.048	13	
	0.026										7.470	6	
	0.034	0.0006										13	
	0.028	5.000										18	
	1.040								0.375 *	0.981 *	4.72	404	
0.009 N	1.070						0.003		6.23 *	0.219 *	••••	214	
0.005 BM	0.417	0.0047 *					0.003 B		3.83 *	0.780 *	0.587	47	
7.500 WA	0.606	0.0009		0.032			J		3.55	1.16 *	5.66	169	
	0.048 J	0.0005		4.446								17	
	0.037	0.0008										42	

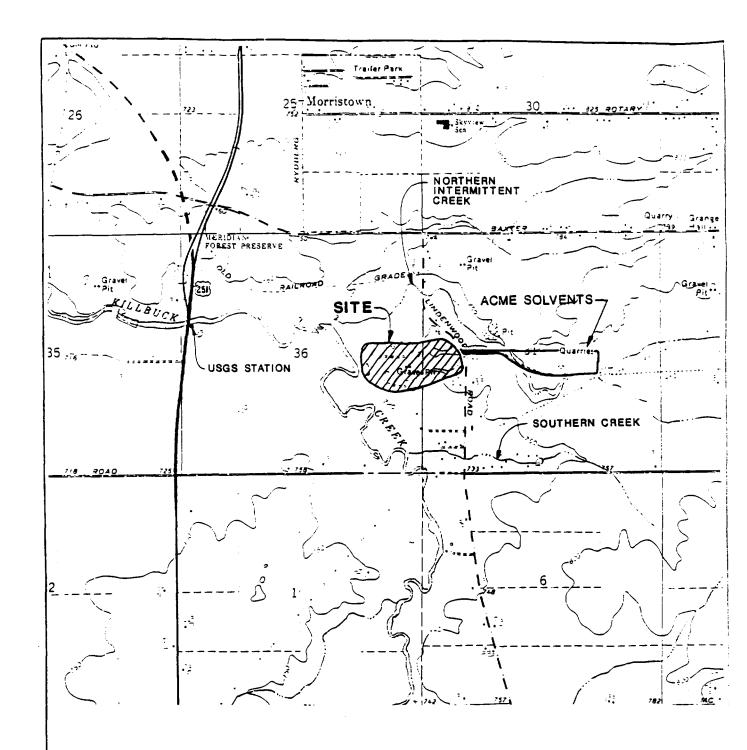
^{1 =} Results are the mean of Rounds 1 and 2 data when both rounds had measurable concentrations.

B = Reported value is greater than or equal to instrument detection limits but less than contract required detection limits.

M = Indicates spike sample recovery is not within control limits.

J = The associated value is considered estimated because control criteria were not met.

* = Indicates duplicate analysis is not within quality control limits.



BASE MAP DEVELOPED FROM ROCKFORD SOUTH, ILLINOIS 7.5 MINUTE USGS TOPOGRAPHIC QUADRANGLE MAP DATED 1971 PHOTOREVISED 1976



FIGURE 1

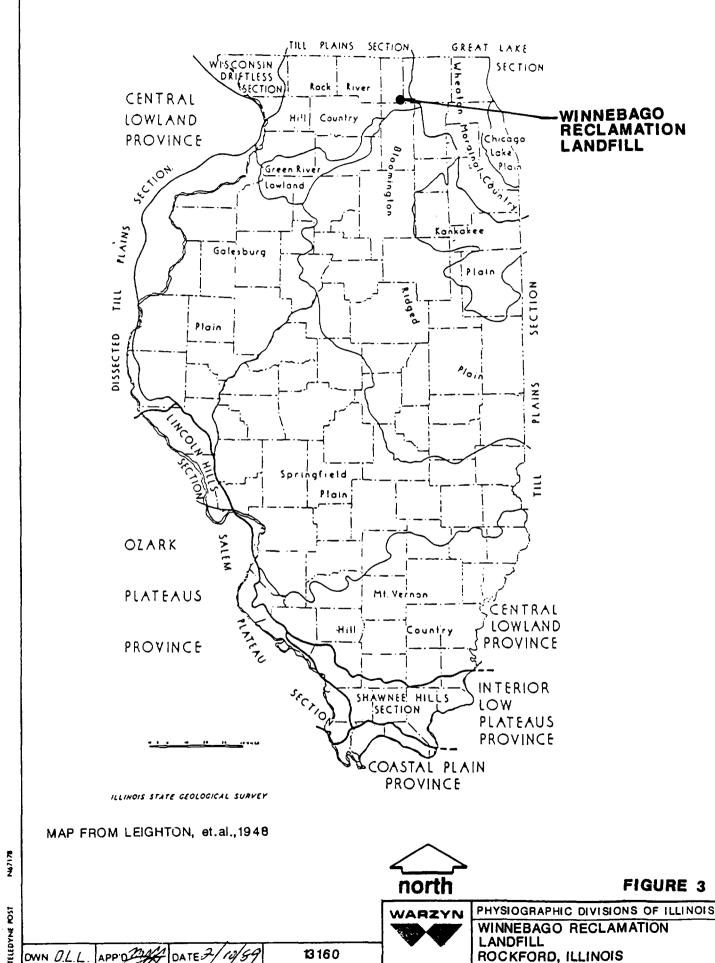
WARZYN

SITE LOCATION MAP WINNEBAGO RECLAMATION LANDFILL ROCKFORD, ILLINOIS

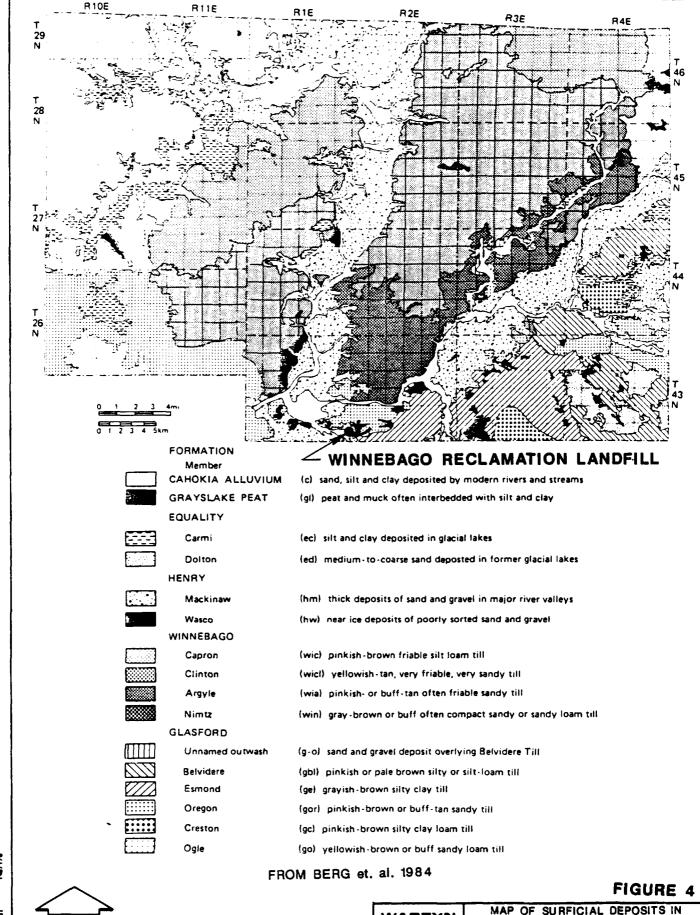
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13160



TELEBYNE POST



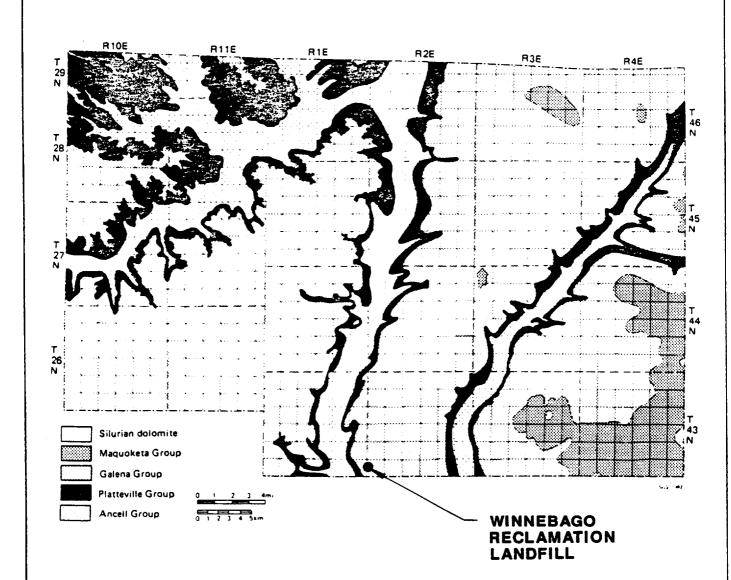
R 7.3

north

DATE

DWND, Ll

WARZYN ENGINEERING INC MAP OF SURFICIAL DEPOSITS IN BOONE & WINNEBAGO COUNTIES WINNEBAGO RECLAMATION LANDFILL ROCKFORD, ILLINOIS



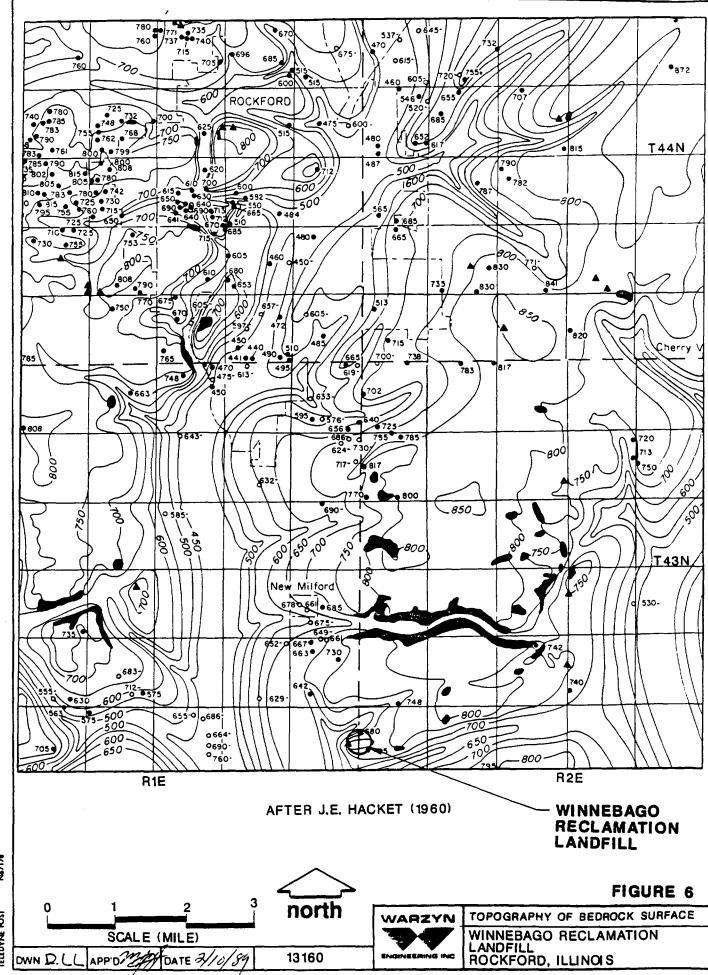
AFTER BERG et. al. 1984



FIGURE 5



AREAL GEOLOGY OF THE BEDROCK SURFACE WINNEBAGO RECLAMATION LANDFILL ROCKFORD, ILLINOIS



₹ **2**

TELEDYNE POST

SYSTEM	GROUP	FORMATION & THICKNESS	GRAPHIC COLUMN
QUATER- NARY		0 - 450 ft	
SILUR.		50 ft	
_	Maquoketa	150 - 200 ft	
ORDOVICIAN	Galena	250 ft	//////////////////////////////////////
ORD	Platteville	100 ft	
Į		Glenwood 5 - 60 ft	
	Ancell	St. Peter 200 - 400 ft	
		Potosi 50 - 100 ft	7,7,7,7
		Franconia 50 - 100 ft	
MAIR		Ironton – Galesville 75 – 170 ft	
CAMBRIAN 500 \$15 my BF		Eau Claire 350 - 450 ft	
		Mt. Simon 1000 - 1600 ft	
	※GRANITE ※		

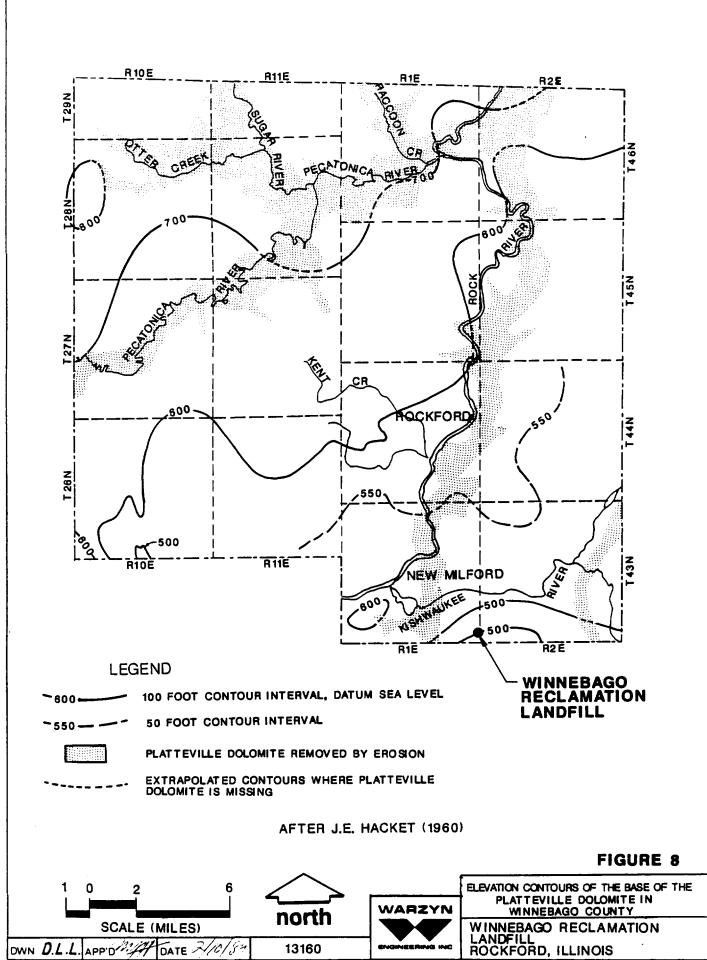
FROM BERG et. al. 1984

FIGURE 7

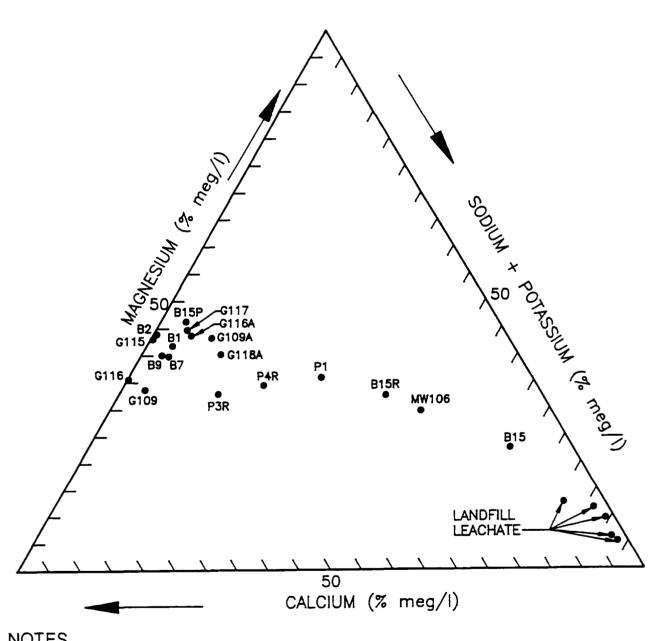


STRATIGRAPHIC COLUMN FOR BOONE & WINNEBAGO COUNTIES WINNEBAGO RECLAMATION LANDFILL ROCKFORD, ILLINOIS

TELEDYNE POST



TELEDYNE POST N67178

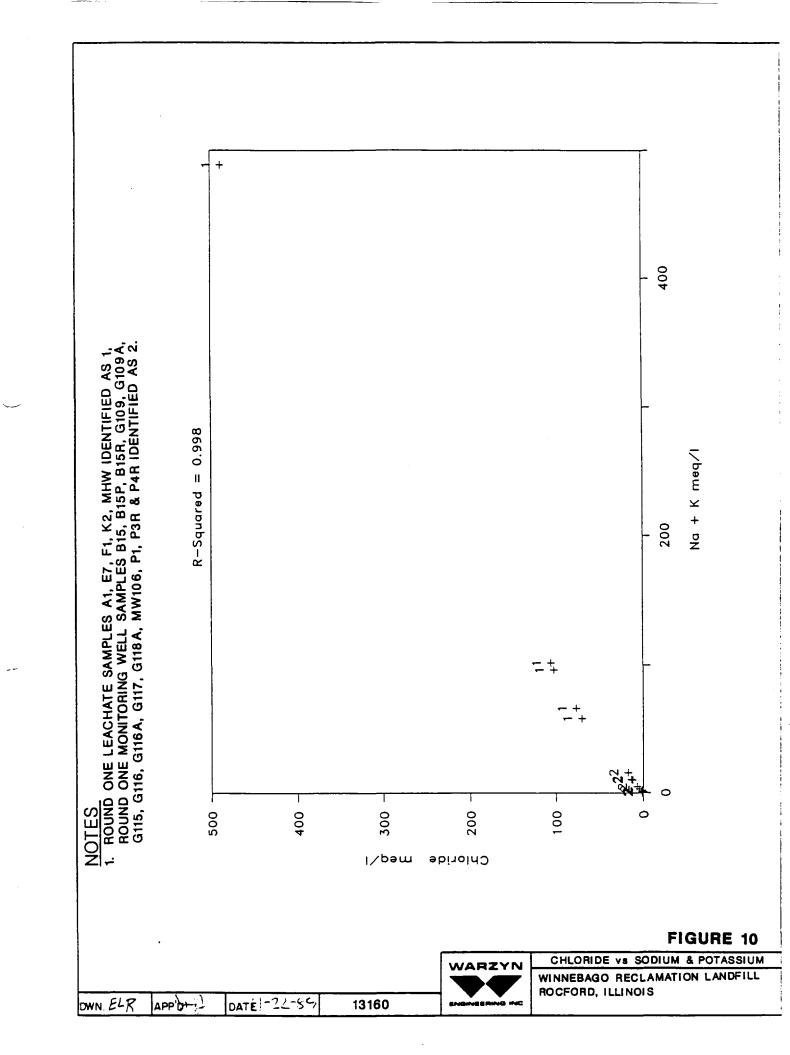


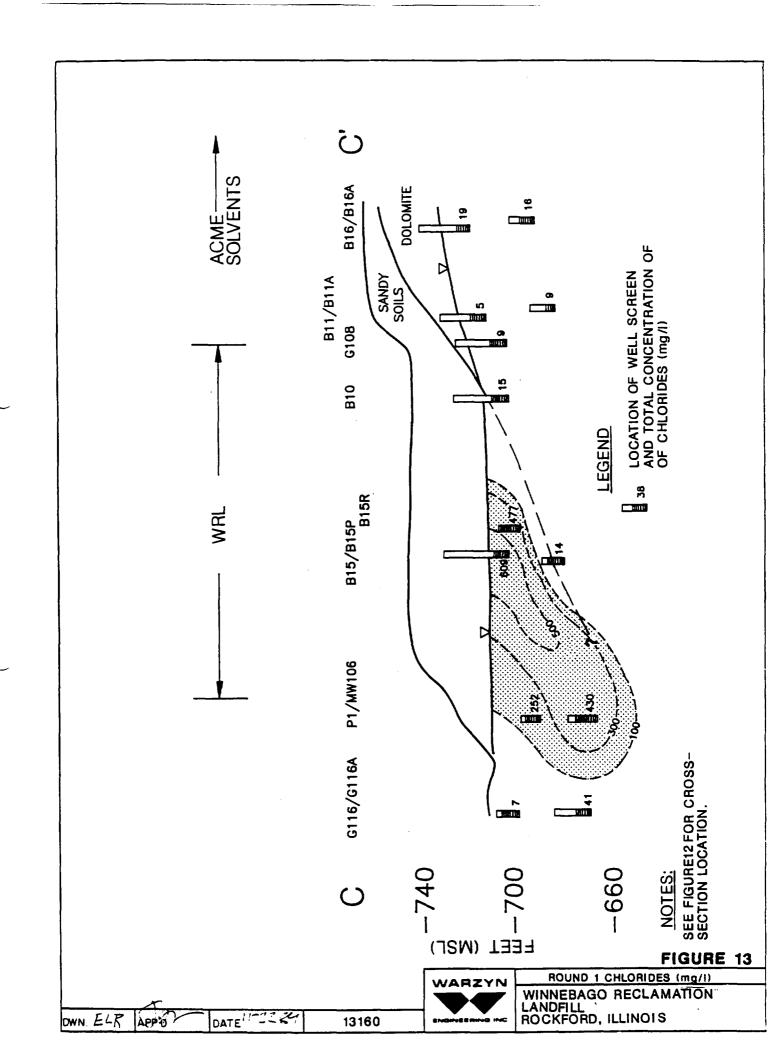
NOTES

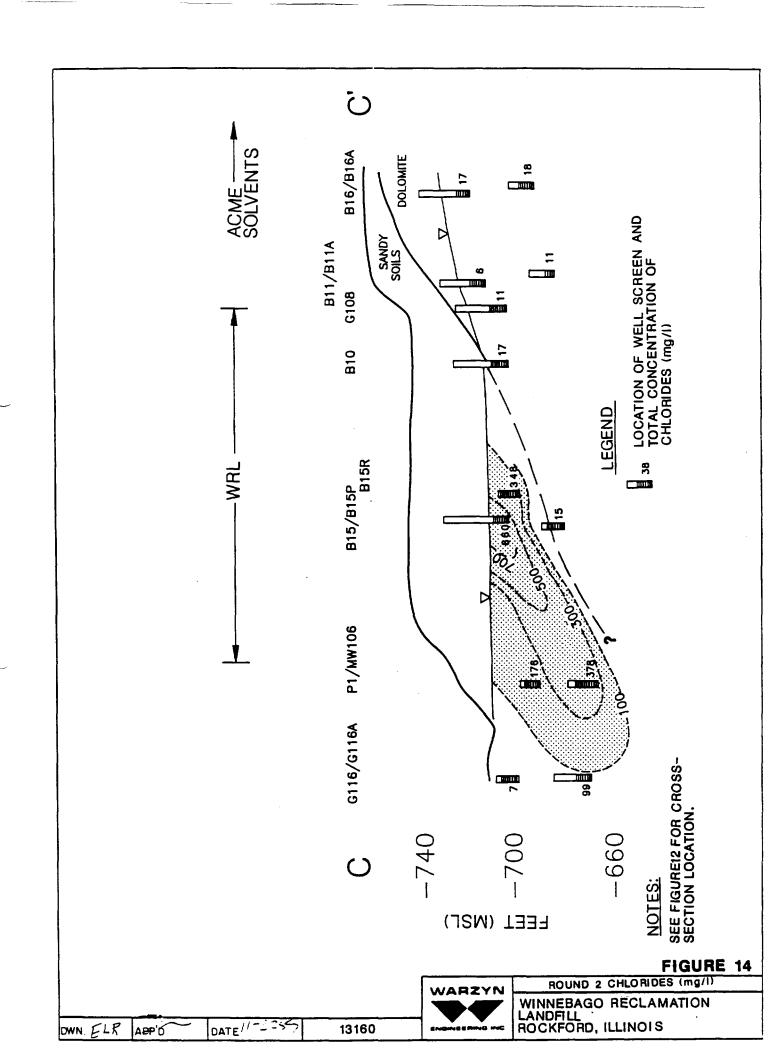
1. ALL DATA FROM ROUND 1 SAMPLING EXCEPT FOR B1, B2, B7, AND B9 WHICH ARE FROM AUGUST 8, 1988 ACME SOLVENTS RI DATA PROVIDED BY THE U.S. EPA

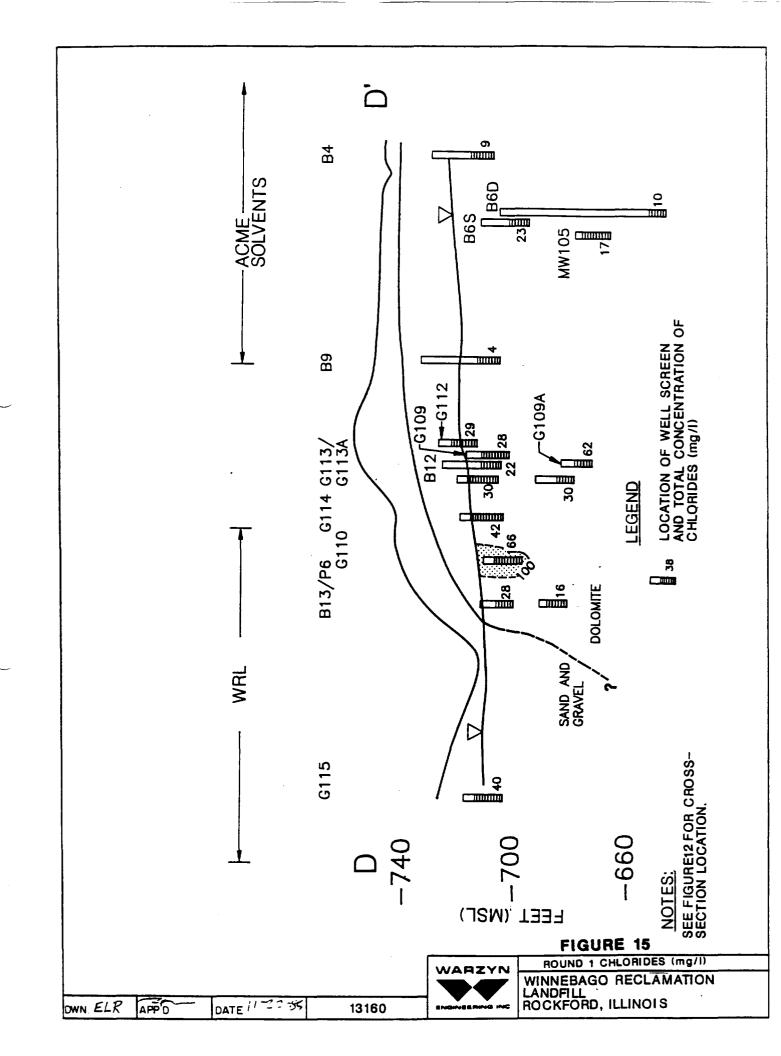
FIGURE 9

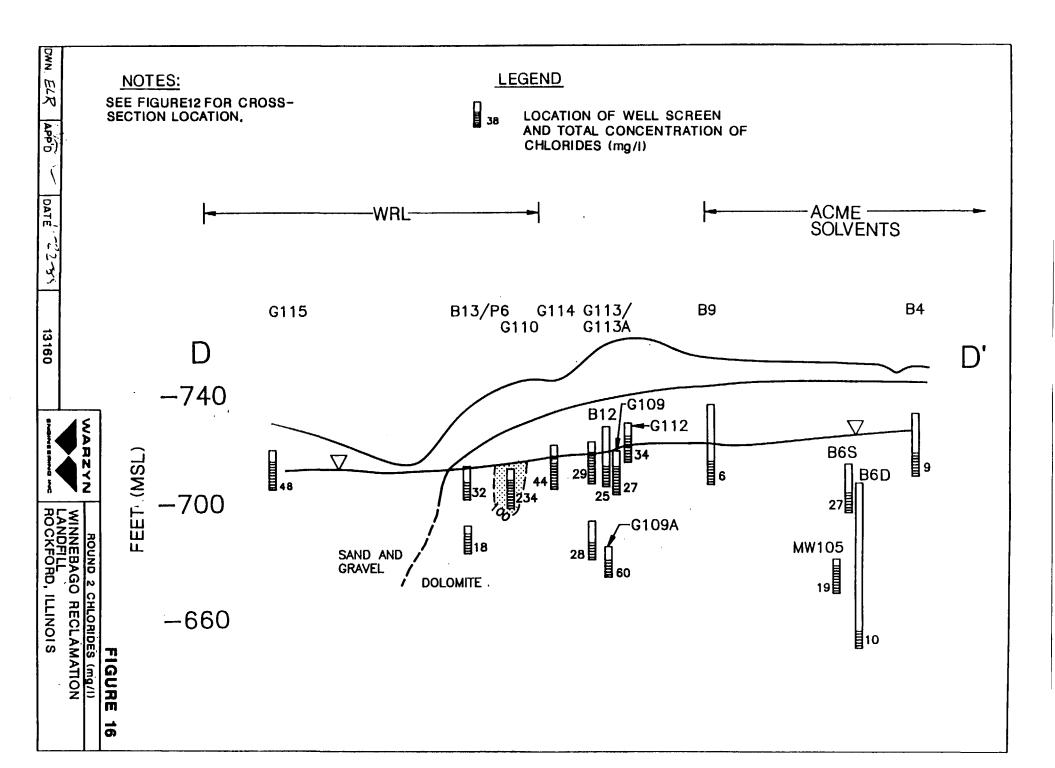


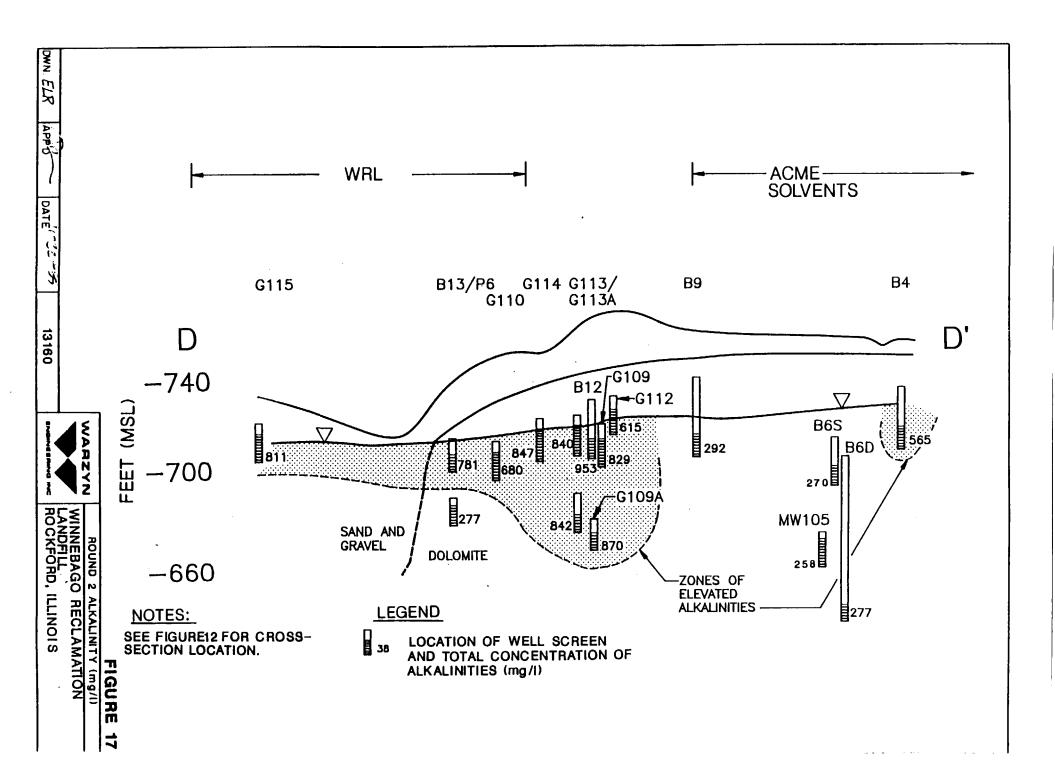


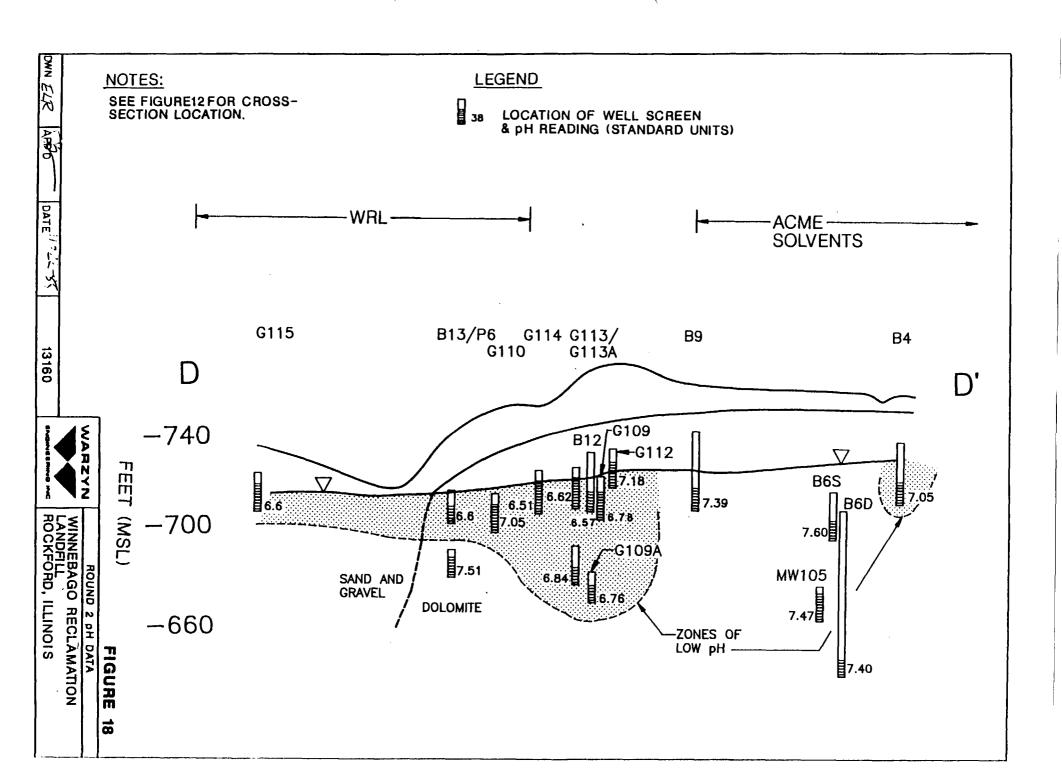


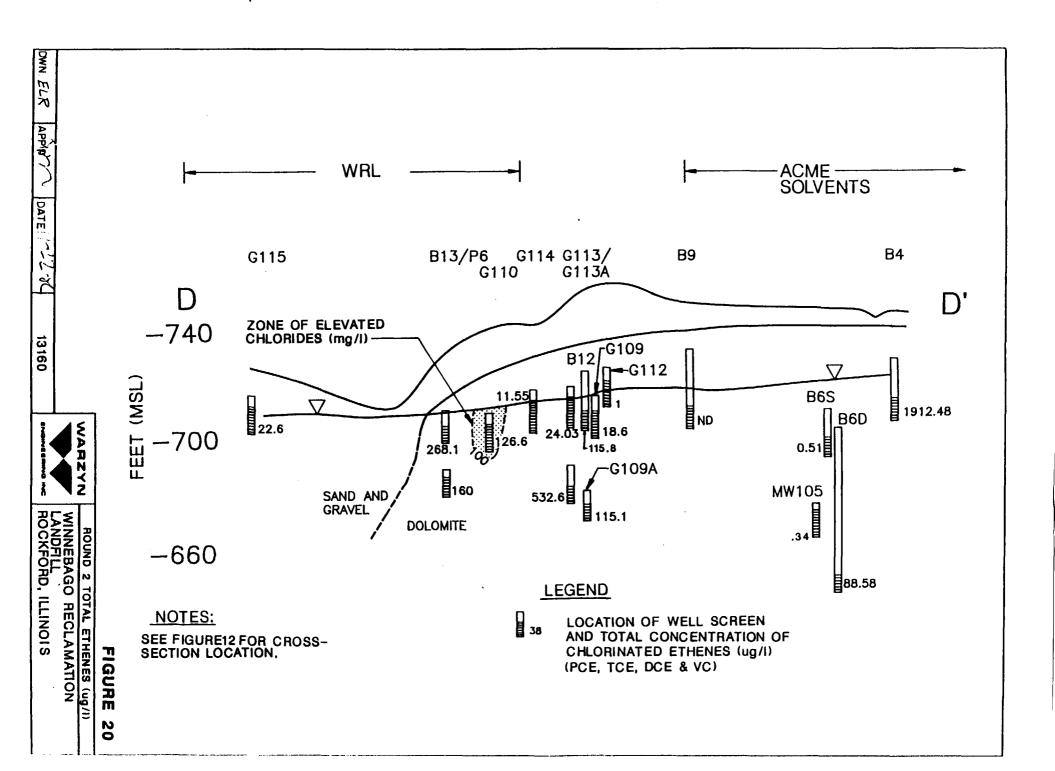


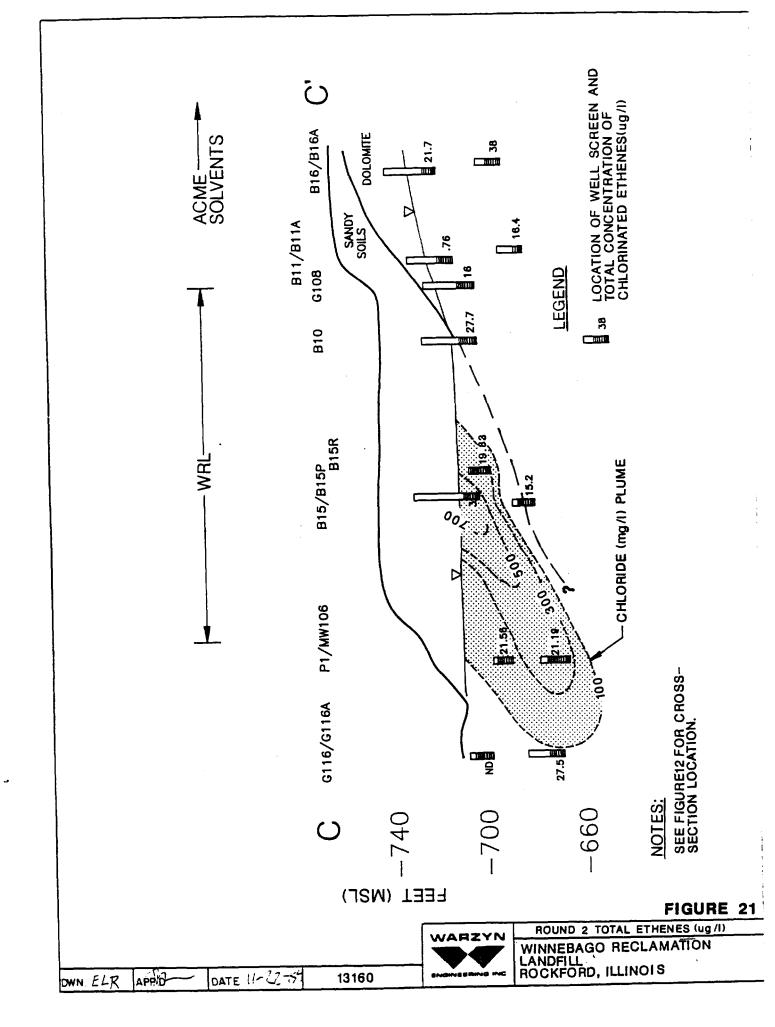


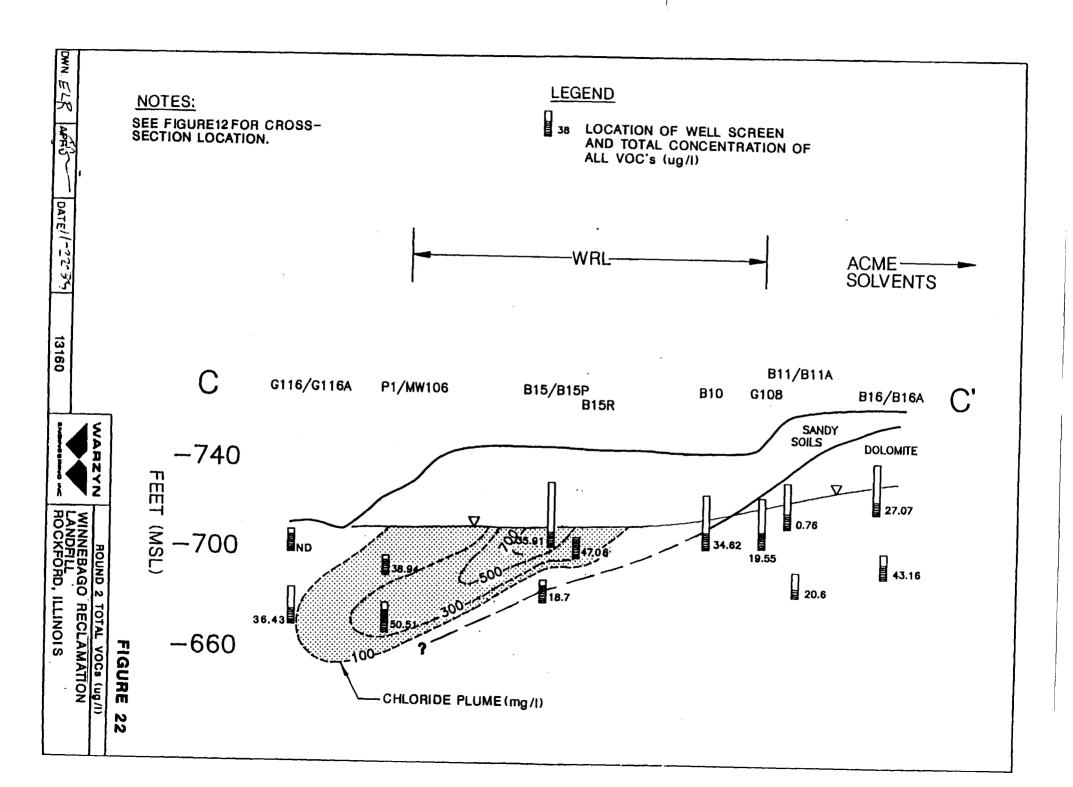












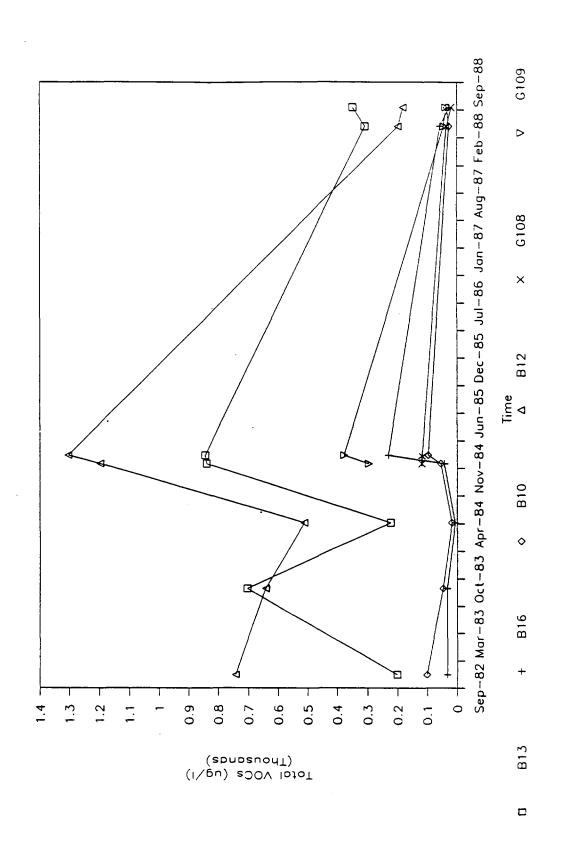


FIGURE 23



SSARDY CONGRESSORS SACOPIUS IN ACT LORD SARDARY SACOPIUS IN ACT SACOPIUS IN AC



 DELIGOL 4:22. E 6:50 M 6:3090 + Mont Mt 88080 + 313:344:0508

 CHICYGO 5:00 C 7:50 M 9 3:990 + Mont Mt 80:00 + 3:08 83:2600

 MIRASTROPORT 2:5 2 M 4:33 + 30 M 9 10:30 + M 9 2:55 M 9:00 M 2:55 M 9:00 C 2:32 M 9:00 M M 9:00 M 9:

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Appendices Project No. 13160

Interim Groundwater
Quality Evaluation
Winnebago Reclamation Landfill
Rockford, Illinois

Prepared for:

Respondents Steering Committee Rockford, Illinois

Prepared by:

Warzyn Engineering Inc. Chicago, Illinois

APPENDIX A BORING LOGS

Winnebago Reclamation Landfill Rockford, Illinois Field PID Readings

Borin	g No: P3R	Borin	g No: G112	Borin	g No: G113A
Depth (ft) Background	Field PID (ppm) = 0.2	Depth (ft) Background	Field PID (ppm) = 0.2	<u>Depth (ft)</u> Background	Field PID (ppm) = 0.2
3 1/2-5	0.2	3 1/2-5	0.2	3 1/2-5	0.2
8 1/2-10	0.2	8 1/2-10	0.2	8 1/2-10	0.2
13 1/2-15	0.2	13 1/2-15	0.2	13 1/2-15	0.2
18 1/2-20	0.2	30 4/ 2 30		18 1/2-20	0.2
23 1/2-25	0.2			23 1/2-25	0.2
28 1/2-30	0.2			28 1/2-30	0.2
33 1/2-35	0.2				5.2
38 1/2-40	0.2				
43 1/2-45	0.2				
48 1/2-50	0.2				
Borin	g No.: P4 R	Boring	No. G113A	Borin	ng No. G114
Depth (ft)	Field PID (ppm)	Depth (ft)	Field PID (ppm)	Depth (ft)	Field PID (ppm)
Background :		Background =		Background	
53 1/2-55	0.2	3 1/2-5	0.2	3 1/2-5	0.2
58 1/2-60	0.2	8 1/2-10	0.2	8 1/2-10	0.2
63 1/2-65	0.2	13 1/2-15	0.2	13 1/2-15	0.2
68 1/2-70	0.2	18 1/2-20	0.2	13 1/2-13	0.2
∞ 1/2-70	0.2	23 1/2-25	0.2		
		28 1/2-30	0.2		
		23 1/2-30	0.2		
Borin	g No: G115	Boring	No: G116A	Borin	g No: G118
Depth (ft) Background =	Field PID (ppm) = 0.2	<u>Depth (ft)</u> Background =	Field PID (ppm) 0.2	Depth (ft) Background	Field PID (ppm) = 0.2
3 1/2-5	0.3	3 1/2-5	0.2	3 1/2-5	0.2
8 1/2-10	0.3	8 1/2-10	0.2	8 1/2-10	0.4
13 1/2-15	0.3	13 1/2-15	0.2	13 1/2-15	0.2
18 1/2-20	0.2	18 1/2-20	0.2	18 1/2-20	0.2
		23 1/2-25	0.2	23 1/2-25	0.2
		28 1/2-30	0.2	28 1/2-30	0.2
		33 1/2-35	0.2	-5 -7 - 55	V.=
		38 1/2-40	0.2		
		43 1/2-45	0.2		
				Boring No	. G11 8A
				<u>Depth (ft)</u> Background =	Field PID (ppm) = 0.2
				33 1/2-35	0.2
				38 1/2-40	0.2
				43 1/2-45	0.2
				•	

(ppm) = parts per billion of benzene equivalent.

160TBL01DBM



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G112**Surface Elevation 761.3
Job No. 13160
Sheet 1 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ---SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION Rec (in.) and Remarks (qa) LL No. Depth PL (tsf) Thin Black SILT Topsoil (ML) Loose, Red Brown Fine to Medium SAND, Some Silt (SM) 1 18 M 11 Very Dense, Light Red Brown Fine SAND, Little Silt (SP) 18 M 51 10-Medium Dense, Light Red Brown Fine to Medium SAND, Some Silt (SM) 3 14 M 29 Light Brown Weathered DOLOMITE 4 0 100 BEDROCK Run 1: 24-34', 96% Recovery of Light Brown, Medium Hard, Fractured Vuggy DOLOMITE, Vugs Range from Pinhole to 1.5" dia., Hard White Chert Layers at 25' RI (1.5") & 28.5 (1.0"), Little if any Water Loss, RQD=78.3% Run 2: 34-44'; 98% Recovery of Light Yellow Brown, Medium Hard, Fractured Vuggy DOLOMITE, Vugs Ranged from Pinhole to 0.25", No water Loss; RQD = 71.6% R2 (Continued) **GENERAL NOTES** WATER LEVEL OBSERVATIONS While Drilling 💆 Start 11/4/87 End 11/4/87
Driller Chief MG Rig CME ____ Upon Completion of Drilling _ Time After Drilling Logger Editor Depth to Water Drill Method RB w/ DM-RC Depth to Cave in The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill Surf

Boring No. **G112**Surface Elevation 761,3
Job No. 13160
Sheet 2 of 2

Location Rockford, Illinois ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -**SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION** qu (qa) Rec Moist and Remarks Depth LL End Boring at 44' Install Well G112 at 44' 50--55-



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. G113
Surface Elevation 759.9
Job No. 13160
Sheet 1 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -**SAMPLE** SOIL PROPERTIES VISUAL CLASSIFICATION Rec Moist (de) and Remarks Depth PL (in.) (tsf) See Boring Log G113A for 0-49' 15-20-25-(Continued) **GENERAL NOTES** WATER LEVEL OBSERVATIONS Start 11/2/87 End 11/2/87
Driller Chief MG Rig CME While Drilling <u>\sqrt{y}</u> ___ Upon Completion of Drilling _ Time After Drilling Logger Editor Depth to Water Depth to Cave in Drill Method RB w/ DM The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G113**Surface Elevation 759,9
Job No. 13160
Sheet 2 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ----**SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION** qu (qa) Rec Hoist and Remarks Depth LL PL (tsf) End boring at 49' Install Well G113 at 48.5' 55-



Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF TEST BORING

Boring No. G113A Project Winnebago Reclamation Landfill Surface Elevation 760.0 Job No. 13160

Location Rockford, Illinois Sheet 1 of 2 ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION Rec Moist and Remarks (qa) LL PL No. Depth (in.) (tsf) Soft, Black SILT Topsoil, Some Fine Sand (ML) Soft, Brown Black SILT, Some Sand, Some Clay (ML) 18 \mathbf{D} Loose, Brown Fine to Medium SAND, Little Silt (Possible Fill) (SP) Medium Dense, Yellow Brown Fine to Medium SAND, Some Silt (Possible Fill) (SP) 2 18 D 27 10-Dense, Brown Fine to Coarse SAND, Some Fine Gravel (SW) 3 10 37 M 15-4 8 M 100 20-/12" Granite Chip in Spoon Tip 5 10 82 M 6 8 100 M Brown Silty Clay with Coarse Sand in Tip Light Yellow Brown DOLOMITE Bedrock 50/ 0 Run 1: 35-42'; 94% Recovery of Light Yellow Brown, Medium Hard Fractured, R1 Vuggy DOLOMITE; Vertically Fractured 36.1-38.3'; Vugs Range from Pinhole to 0.5" dia., No Water Loss; RQD = 100% Run 2: 42-50'; 83% Recovery of Light **GENERAL NOTES** WATER LEVEL OBSERVATIONS Start 10/28/87 End 10/28/87 Upon Completion of Drilling While Drilling Driller Chief MG Rig CME Time After Drilling Logger Editor Depth to Water

Drill Method RB w/ DM-RC



Project Winnebago Reclamation Landfill Surf

Boring No. **G113A**Surface Elevation 760.0
Job No. 13160
Sheet 2 of 2

Location Rockford, Illinois ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 --**SOIL PROPERTIES SAMPLE** VISUAL CLASSIFICATION Rec Hoist and Remarks (qa) LL PL Depth Yellow Brown Medium Hard, Fractured, Vuggy DOLOMITE: Vugs Range from R₂ Pinhole to 0.25" dia.; Little if any Water Loss, RQD = 93.7%Run 3: 50-54'; 100% Recovery of Light Yellow Brown, Medium Hard, Fractured Vuggy DOLOMITE; Vertically Fractured 50-7-51.5', hard White Chert Layers at 50.5' (2") and 52' (1.5") Vugs range from Pinhole to 1.0"; Water Loss of 200 gals, RQD = 16.6% R3 Run 4: 54-64', 80% Recovery of Light Brown Medium Hard Fractured Very Vuggy DOLOMITE; Vugs Range from Pinhole to R4 1.0"; Water Loss of 400 gal; RQD = 87.5 Run 5: 64-74' 100% Recovery of Light Yellow Brown Medium Hard, Fractured, Vuggy DOLOMITE, Vugs Range from Pinhole to 0.25"; Water Loss of 250 gal; RQD = 58.3%**R5** End Boring at 75' Install Well G113A at 75'

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Boring No. G114 Surface Elevation 755.4 Project Winnebago Reclamation Landfill Job No. 13160

Location Rockford, Illinois Sheet 1 of 2 ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ----SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION Rec Moist and Remarks Depth (qa) LL PL (in.) (tsf) Soft Black Sandy SILT Topsoil (SM) Loose, Dark Brown SILT, Some Fine to Medium Sand, Some Clay (ML) 11 14 M Medium Dense, Red Brown Fine to Medium SAND, Some Silt, Trace Fine Gravel (SP) 16 68 M Very Dense, Yellow Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Trace Silt (SW) 3 5 M 75/ Weathered DOLOMITE Bedrock, Some Chert Chips in Mud Return Run 1: 19-29'; 100% Recovery of Light Yellow Brown, Medium Hard, Fractured RI Slightly Yuggy DOLOMITE; Chert Layer @ 19.5' (1"); Thin Interbedded Chert Seams from 21.5-22.5'; Vugs Range from Pinhole to 1.0"; No Water Loss; RQD = 78.3% Run 2: 29-39'; 100% Recovery of Light Yellow Brown, Medium Hard, Fractured, Slightly Vuggy DOLOMITE; Vertically Fractured 33.4-34.4'; Gravel Size Pieces 35.9-36.8', Water Loss 200 gals; RQD = R2 58.3% Run 3: 39-46'; 93% Recovery of Yellow Brown, medium Hard, Fractured Slightly Vuggy DOLOMITE; Chert Layer at 40.5' (2.5"); Gravel Size Pieces at 41.3-42.0'; Water Loss of 150 gals; RQD = 42.8% (Continued) **GENERAL NOTES** WATER LEVEL OBSERVATIONS Start 11/3/87 End 11/3/87
Driller Chief MG Rig CME While Drilling $\frac{36.0}{2}$ Upon Completion of Drilling $\frac{36.2}{2}$ Time After Drilling Depth to Water Logger Editor Depth to Cave in Drill Method RB w/ DM-RC

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill Su

Location Rockford, Illinois Sh

Boring No. G114
Surface Elevation 755.4
Job No. 13160
Sheet 2 of 2

ONE PIERCE PLACE - SUITE 1110, ITASCA, ILL. 60143 - TEL(312) 773-8484 ----**SAMPLE** SOIL PROPERTIES **VISUAL CLASSIFICATION** qu (qa) Rec Moist and Remarks LL PL Depth End Boring at 46' Install Well G114 at 46'

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Project Winnebago Reclamation Landfill

Boring No. **G115**Surface Elevation 726.9
Job No. 13160
Sheet 1 of 1

Location Rockford, Illinois ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ----SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION (de) Rec Moist and Remarks Depth LL PL kin.) (tsf) Soft, Brown Sandy SILT Topsoil, Little Vegetation, Possible Leachate Seen (SM) Loose, Black Silty SAND & Pea GRAVEL (GM) 15 M 10 Loose, Light Brown SILT, Some Clay (ML) Interbedded Depositional Very Fine SAND, SILT and Fat CLAY Lenses (CH-MH) 16 M 16t 10-12 W 15-Dense, Gray Black Mottled Fine to Medium SAND, Some Silt, Trace Clay (SM) 4 18 W 46 20-End Boring at 20' Install Well G115 at 21' 30

WATER LEVEL OBSERVATIONS

While Drilling \$\frac{\sqrt{14.0}}{2}\$ Upon Completion of Drilling \$\frac{16.4}{2}\$

Time After Drilling \$\frac{\sqrt{16.4}}{2}\$

Depth to Water \$\frac{\sqrt{16.4}}{2}\$

Depth to Cave in \$\frac{\sqrt{16.4}}{2}\$

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

GENERAL NOTES

Start 10/23/87 End 10/23/87

Driller _____ Chief __MG __Rig CME ____

Logger ____ Editor ____ 550

Drill Method 4,25" ID HSA



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G116**Surface Elevation 711.4
Job No. 13160
Sheet 1 of 1

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 --SAMPLE **SOIL PROPERTIES** VISUAL CLASSIFICATION Rec Moist and Remarks Depth (qa) LL PL (tsf) See Boring Log G116A for 0-14' Blind HSA Drilling 10-End Boring at 14' Install Well G116 at 13.5' WATER LEVEL OBSERVATIONS **GENERAL NOTES** While Drilling \(\frac{\sqrt{5.0}}{\text{total}} \) Upon Completion of Drilling \(\frac{4.6}{\text{total}} \) Start 10/27/87 End 10/27/87
Driller Chief MG Rig CME Time After Drilling Logger Depth to Water ____ Editor____ Depth to Cave in Drill Method 4,25" ID HSA The stratification lines represent the approximate boundary between soil types and the transition may be graduel.

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Project Winnebago Reclamation Landfill Surf

Location Rockford, Illinois

Boring No. **G116A**Surface Elevation 711.4
Job No. 13160
Sheet 1 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ----**SOIL PROPERTIES SAMPLE** VISUAL CLASSIFICATION Rec Moist and Remarks Depth (qa) LL PL Kin. > (tsf) Soft, Dark Black Mollic SILT Topsoil (ML) Loose, Gray Black Fine to Medium SAND, Some SILT (SM) W 18 13 Medium Dense, Yellow Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Little Silt (SW) 2 15 W 21 W 18 30L 15-Very Dense, Light Brown Fine to Coarse W 18 70 SAND, Some Silt, Some Fine to Coarse 20-Gravel (SW) 5 18 W 58 25-7 6 100 W 15 40 (Continued) W WATER LEVEL OBSERVATIONS **GENERAL NOTES** While Drilling 25.0 Upon Completion of Drilling 3.6Start 10/27/87 End 10/27/87 Driller Chief MG Rig CME Time After Drilling Logger Editor Depth to Water Depth to Cave in Drill Method 4.25" ID HSA The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill Surface Elevation

Location Rockford, Illinois Sheet 2 of

Boring No. **G116A**Surface Elevation 711.4
Job No. 13160
Sheet 2 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -**SAMPLE** SOIL PROPERTIES **VISUAL CLASSIFICATION** qu (qa) Kec | Moist and Remarks Depth LL PL 75 9 18 W End boring at 45' Install well G116A at 43' 85-

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Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G117**Surface Elevation 721.9
Job No. 13160
Sheet 1 of 1

				- ONE	PIE	CE PLACE . SUITE 1110, ITASCA, ILL. 60143 .	· TEL(312)	773 - 8484 -				
	SA	MPI	LE			VISUAL CLASSIFICATION	N.	SOIL	PRO	PEF	RTIE	ES
No.	Rec E(in.)	Moist	N	Depth		and Remarks		qu (qe) (tsf)	W	LL	PL	D
1				E	•	Thin Dark Brown Silty SAND Topsoil	(SM)					
	<u> </u>			E		Dense, Light Brown Fine to Coarse SA Coarse GRAVEL (GW)	AND &					
2	18	D	44	<u> </u>		Coarse GRAVEL (GW)			 			<u> </u>
				Ē	•							
3	18	м	32			Dense, Light Brown Fine to Coarse SA	AND,		-			
				E 10-		Trace Fine Gravel (SW)			 			
	}}			E								
4	12	W	32			Dense, Brown Fine to Coarse SAND, I			 -			
				15-		Some Fine to Coarse Gravel, Little Silt	t (SW)					_
				<u>-</u> E								
5	18	w	43									
	Π			E 20-								
		 										
6		W		F								
				- 25- -		End Boring at 25'						
				Ē		Install Well G117 at 23.5°						
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	1.1	l	WA		L	VEL OBSERVATIONS	G	ENERA	L NO	TES		
Whi	le Dril	lling	⊻ 1	4.5	Upo	on Completion of Drilling 14.5 St	tart 10/1	3/87 End	10/13	/87_		
	e Afte th to \			10 m		¥ L	ogger	Chief Edito	r	R	ig CM 550	
Dep	th to (Cave i	in	nes rer)	_ {D ₁	rill Metho	d 4.25" II	HSA			
\ ty	pes and	the t	ransi	tion may	/ be	nt the approximate boundary between soil					•••••	

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Project Winnebago Reclamation Landfill

Location Rockford, Illinois Sheet 1 of 1

Boring N	10. G	118
Surface :	Elevation	715.5
Job No.	131	60
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ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -SAMPLE SOIL PROPERTIES VISUAL CLASSIFICATION Rec Moist and Remarks Depth (qa) LL PL (in.) (tsf) Black Silty Sand Topsoil (SM) Light Brown Fine to Coarse SAND, Some <u>13</u>を Fine to Coarse Gravel (SW) 3 1 M Very Stiff, Brown Lean CLAY, Some Silt (CL) 2 18 28L M Dense, Light Brown Fine to Coarse GRAVEL, Some Fine to Coarse Sand, Trace 3 15 W 45 Silt (GW) 12 W 40 4 Medium Dense, Light Brown Medium to 5 W 26 Coarse SAND, Trace Silt, Little Fine Gravel 25. (SP) W 29 6 30-End Boring at 30' Install well G118 at 13.5' 35-WATER LEVEL OBSERVATIONS **GENERAL NOTES** Start 10/13/87 End 10/13/87

Driller _____ Chief ___ CB __ Rig CME While Drilling 25.0 Upon Completion of Drilling 7.8Time After Drilling 14 hrs Depth to Water __6.5' Logger ____ _ Editor_ Depth to Cave in Drill Method 4.25" ID HSA The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Boring No. G118A Project Winnebago Reclamation Landfill

Surface Elevation 715.5 Job No. 13160 Sheet 1 of 2 Location Rockford, Illinois

<u></u>				- ONE	PIE	RCE PLACE - SUITE 1110, ITASCA, ILL. 6014	3 · TEL(312)	773-8484 -				
	S	AMP	LE			VISUAL CLASSIFICATION	ON	SOIL	PRO	PE	RTII	ES
No.	Rec	Moist	N	Depth		and Remarks		qu (qe) (tsf)	W	LL	PL	D
				5 10 15 20 25 30 30 30 30 30 30 30 30 30 30 30 30 30		See Boring Log G118 for 0-3	30*					
1	10	W	42			Dense, Reddish Light Brown Mediu						
	\ <u>``</u>	†"	-	35-		Coarse SAND, Some Fine Gravel, T (SP)	race Silt					
				E E		(Continued)						
2	14	W	68	- 40-								
	1	1	WA		<u>} []</u>	EVEL OBSERVATIONS	(ENERAL	. NO	TES	L	
Time Dept	: Aft h to	er Dri Water	¥ 6 lling	.5		on Completion of Drilling	Start 10/ Driller Logger	14/87 End Chief	10/14 CE	/ 87	ig CN 550)
The	stra	Cave tificated the t	ion (nes re	prese	nt the approximate boundary between soil gradual.					••••••	



Project Winnebago Reclamation Landfill

Boring No. **G118A**Surface Elevation 715,5
Job No. 13160
Sheet 2 of 2

Location Rockford, Illinois

ONE PIERCE PLACE - SUITE 1110, ITASCA, ILL. 60143 - TEL(312) 773-8484 -

	SA	MPI	LE			VISUAL CLASSIFICATION	SOIL	PRO	PE	RTIE	S
No.	Rec (in.)	Moist	N	Depth		and Remarks	qu (qa) (tsf)	v	LL	PL	D
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3	8	W	32	- 45-		End Boring at 45°	 	-			ļ
				<u> </u>		Install Well G118A at 43'					
				E		install well G118A at 43					
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Project Winnebago Reclamation Landfill Su

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Location Rockford, Illinois Sh

Boring No. **G118R**Surface Elevation
Job No. 13160
Sheet 1 of 1

	- ONE P	TERCE PLACE - SUITE 1110, ITASCA, ILL. 6014	3 · TEL(312) 773	·8484 —				
SAMPLE		VISUAL CLASSIFICATION		SOIL	PRO	PER	TIE	S
No. Rec Moist N	Depth	and Remarks		qu (qa)	u	LL	PL	D
E	5-	Hollow Stem Augered to 15', No Sa Refer to Log G118 for Detailed Sul Information		(tsf)				
	15	End Boring at 15'						
		Ziid Boiling at 19						
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		LEVEL OBSERVATIONS		IERAL				
While Drilling Time After Drilling	U	pon Completion of Drilling	Start 6/9/88 Driller ETI	End Chief	.6/9/8 LS	8 Ri	g 913	0
Depth to Water		¥	Logger	_ Editor	*****			
Depth to Cave in			Drill Method I	ISA				 .



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G119**Surface Elevation 717.5
Job No. 13160
Sheet 1 of 1

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -SAMPLE **SOIL PROPERTIES** VISUAL CLASSIFICATION Rec and Remarks Moist (qa) Depth LL PL (in.) (tsf) Dark Brown Silty SAND Topsoil (SM) Medium Dense, Light Brown to Brown Fine to Coarse SAND and Fine to Coarse **GRAVEL (GW)** 19 D Dense, Light Brown Fine to Coarse SAND and Fine to Coarse GRAVEL, Some Silt (GM) 2 10 M 49 12 26 3 Very Dense, Medium to Coarse SAND, Trace Fine Gravel, Some Silt (SM) 4 52L 20-End Boring at 20' Install Well G119 at 18' 35-WATER LEVEL OBSERVATIONS **GENERAL NOTES** While Drilling 11.0 Upon Completion of Drilling 10.3 Start 10/21/87 End 10/21/87 Driller Chief JG Rig CME Time After Drilling _____ Logger Editor Depth to Water Drill Method 4.25" ID HSA Depth to Cave in The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Boring No. G119A Project Winnebago Reclamation Landfill Surface Elevation 717.5 Job No. 13160

Location Rockford, Illinois Sheet 1 of 2 ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 ----**SAMPLE** SOIL PROPERTIES VISUAL CLASSIFICATION Rec Moist and Remarks (qa) Depth LL PL (in.) (tsf) See Boring Log G119 for 0-20' 10-Very Dense, Medium to Coarse SAND, Some Fine Gravel, Trace Silt (SP) 8 100 51 Dense, Fine to Coarse SAND, Some Fine to Coarse Gravel, Some Silt (SW) 3 10 W 39 (Continued) 8 30/ **GENERAL NOTES** WATER LEVEL OBSERVATIONS While Drilling 11.0 Upon Completion of Drilling Start 10/22/87 End 10/22/87 Time After Drilling Driller Chief MG RigCME Depth to Water Logger Editor Drill Method RB w/ DM Depth to Cave in The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. **G119A**Surface Elevation 717.5
Job No. 13160
Sheet 2 of 2

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•		Moist		Depth		qu (qa) (tsf)	W	u	PL	D
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		 		F- 50	End Boring at 49'	7				
				È "	Install Well G119A at 48'					
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Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. P3R
Surface Elevation 747,6
Job No. 13160
Sheet 1 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 --SOIL PROPERTIES SAMPLE VISUAL CLASSIFICATION Rec Hoist and Remarks (qa) LL PL Depth Loose, Yellow SAND & GRAVEL (Fill) (GP) 1 10 D 19 Medium Dense, Dark Brown to Black Lean CLAY, Some Silt (CL) Dense, Yellow Fine to Coarse SAND and 2 15 D 45 Fine to Coarse GRAVEL, Trace Silt (GW) 3 18 M 37 Coarse Rounded GRAVEL, Some Cobbles (GP) 0 M 100 Very Dense, Yellow Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Trace Silt (SW) 5 8 M 64 6 5 D 57 30-7 2 100 Dolomite Chip in Tip (Continued) 10 D 100 WATER LEVEL OBSERVATIONS GENERAL NOTES While Drilling $\frac{\nabla}{2}$ 41.0 Upon Completion of Drilling ____ 40.9 Start 10/16/87 End 10/16/87 Time After Drilling Driller Chief LN Rig CME Depth to Water Logger __ Editor____ Drill Method 4,25" ID HSA Depth to Cave in The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. P3R
Surface Elevation 747.6
Job No. 13160
Sheet 2 of 2

-		MPI				VISUAL CLASSIFICATION	SOIL	PROPERTI			ES [^]	
lo.	Rec E(in.	Moist		Depth	<u> </u>	and Remarks	qu (qa) (tsf)	u	LL	PL		
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				-	밁	Very Dense, Yellow Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Some		ļ	<u> </u>		L	
9	6	W	100 /8"		H	Silt (GM)		_			L	
				E	盟			Ì				
0	0	W	100		H			<u> </u>				
			/6"			End Boring at 50°			<u></u>		\vdash	
	-			Ē		Install Well P3R at 48'						
				<u>-</u> - 55-								
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Project Winnebago Reclamation Landfill

Surface Ele
Job No.

Location

Rockford, Illinois

Sheet
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Boring No. P4R
Surface Elevation 748.0
Job No. 13160
Sheet 1 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -**SAMPLE** SOIL PROPERTIES VISUAL CLASSIFICATION (qu) Rec Hoist and Remarks Depth PL (in.) (tsf) See P3R Boring Log for 0-50' 15-20-25-35-(Continued) WATER LEVEL OBSERVATIONS **GENERAL NOTES** While Drilling $\frac{\sqrt{2}}{2}$ 41.0 Upon Completion of Drilling $\frac{\sqrt{40.9}}{2}$ Start 10/19/87 End 10/19/87 Driller Chief MG Rig CME Time After Drilling ___ Y Logger ... Editor Depth to Water Depth to Cave in Drill Method RB w/ DM The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



Project Winnebago Reclamation Landfill

Location Rockford, Illinois

Boring No. P4R Surface Elevation 748.0 Job No. 13160

Sheet 2 of 2 ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 -SOIL PROPERTIES **SAMPLE** VISUAL CLASSIFICATION qu (qa) Rec Hoist and Remarks LL Depth PL Very Dense, Yellow Brown Fine to Coarse SAND, Some Fine to Coarse Gravel, Some Silt (GM) 10 67 2 W 12 100 714 3 6 W 100 /10 12 W 100 4 End Boring at 70' Install well P4R at 68°



Project Winnebago Reclamation Landfill Surface
Job No.

Location Rockford, Illinois Sh

Boring No. **B15P**Surface Elevation 741.1
Job No. 13160
Sheet 1 of 2

		SA	MPL	E	- UNE	PIE	VISUAL CLASSIFICATION VISUAL CLASSIFICATION			SOIL PROPERTIES					
No.			Moist	N	Depth	Ì	and Remarks) N	qu (qa) (taf)	u	lı	PL	D		
					- - - - -		Blind Mud Rotary Wash Boring to	48.5'							
					- - - - -										
					- - - - 10-										
			; ;		15-										
				,	- - - 20- -										
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				!	30-										
				:	35										
					ا ا را را را را ا		(Continued)								
	Ш_		I	WA		L	EVEL OBSERVATIONS	G	ENERA	L NO	TES				
Tim Dep	th	\fte to V	ling	∑ 3 ling		Upo	on Completion of Drilling33.0	Start 10/1 Driller Logger	15/87 End Chief Edito	10/15 CE	/ 87				
	e si	trati	ficati	on	nes rep	rese	ent the approximate boundary between soil		~~	·····					



Project Winnebago Reclamation Landfill Surface Elevation

Location Rockford, Illinois Sheet 2 of

Boring No. **B15P**Surface Elevation 741.1
Job No. 13160
Sheet 2 of 2

ONE PIERCE PLACE . SUITE 1110, ITASCA, ILL. 60143 . TEL(312) 773-8484 --**SAMPLE** SOIL PROPERTIES VISUAL CLASSIFICATION (qa) Rec Moist and Remarks Depth ιL PL 6 W 75<u></u> Very Dense, Brown SILT, Some Fine to Coarse SAND, Trace Fine Gravel (ML) Very Dense Yellow Weathered DOLOMITE **Bedrock** 2 2 W 80 Dolomite Chip in Spoon Tip End Boring at 63' Install well B15P at 63'

APPENDIX B WELL CONSTRUCTION DETAILS

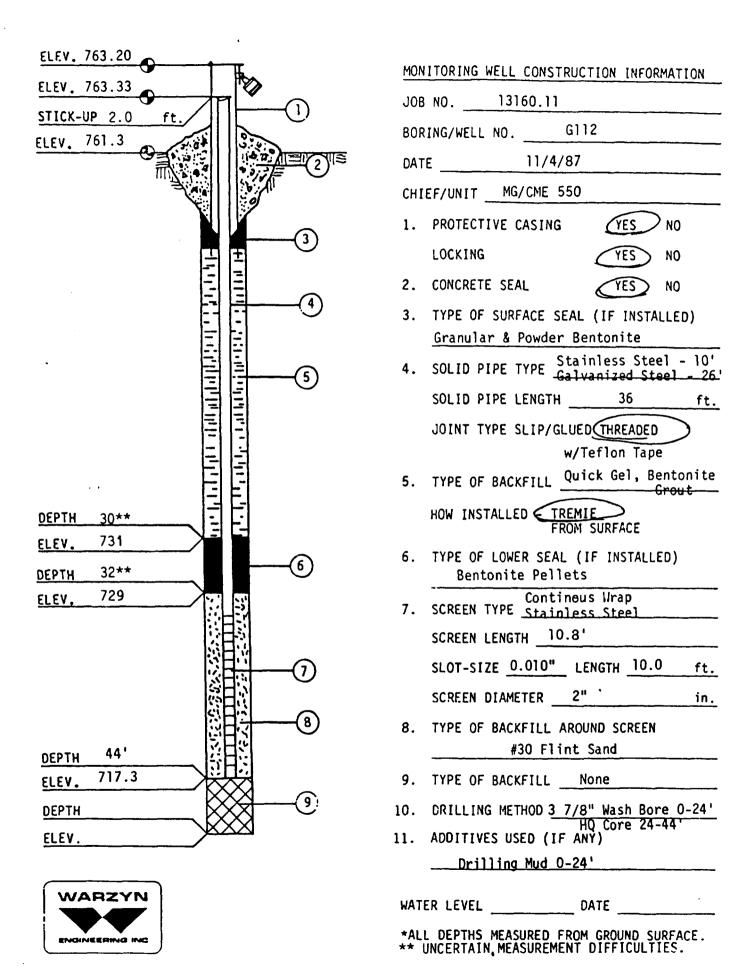
Winnebago Reclamation Landfill
Elevations are in feet referenced to mean sea level (MSL)
These elevations supercede those reported on well construction logs in Appendix B

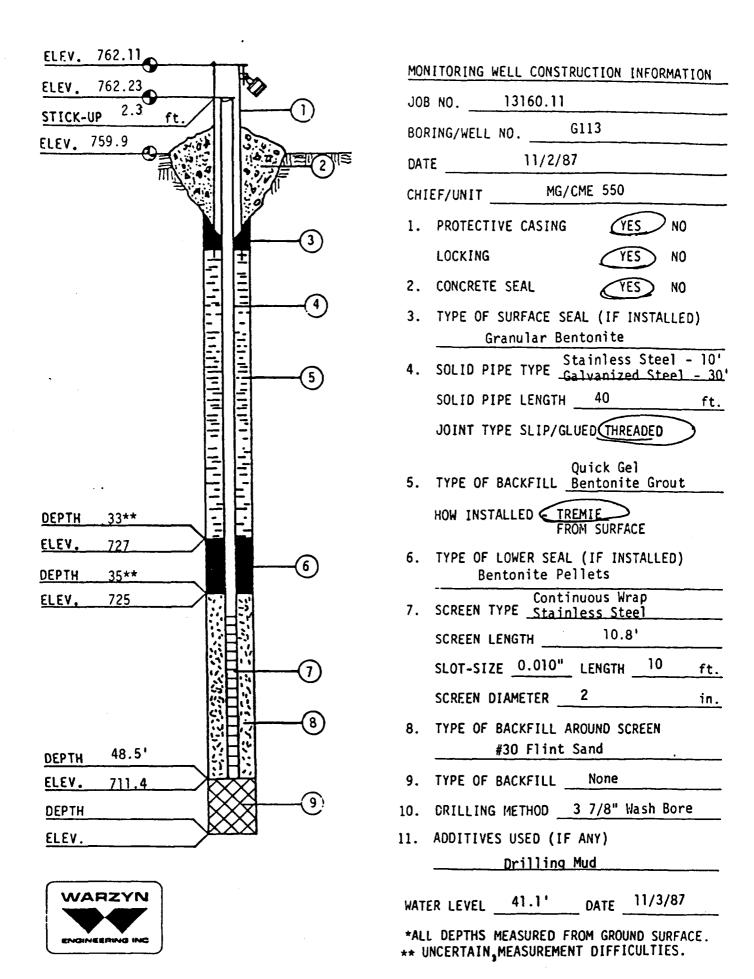
Difference

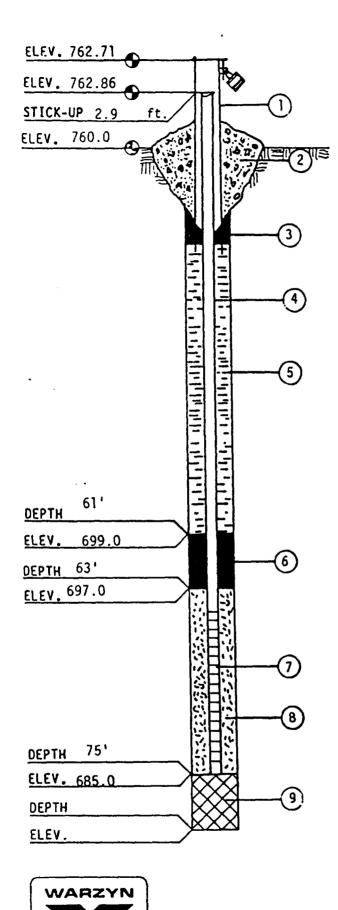
											between			
								Top of	Pio	¥ 0	old			Water
								Outer	Top of	다 야 야	and new	Illinois State	ate	Teble=W
			Total	Total	Length	Top of	Bottom	Casing	Imer	Imer	inner	Plane Co	Coordinates	Piezo
	Drilled	Year	Well.	Screen	of sand	Screen	of Screen Elevation	Elevation	Casing	Casing	casing	2	ë	or clay
Boring No. By	Ву	Dri LL ed	Depth(ft)	Length(ft)	Pack (ft)	Elevation	Depth(ft) Length(ft) Pack (ft)Elevation Elevation 8/89	8/89	Elevation Elevat		on Elevations	Northing Easting	sting	B= [=8
81	343	1982	51.7		16	729.0	724.0	773.19	772.%	772	87 0.09	2002143.6	804385.1	
8 2	333	1982	73.5	v	21	722.1	717.1	792.66	792.34	•	-0.06	2002143.4	803629.6	
2	Æ	1982	64	v	17	712.0	707.0	745.14	744.78		-0.22	2000515.7	802526.1	
94	343	1982	35.5	.	21	724.5	719.5	757.97	757.58	•	-0.08	2001666.9	803477.2	<
8 5	ELE	1982	35	va	5	718.9	713.9	752.94	749.50		-3.35	2001037.3	803545.8 W	Ē
865		1982	48. 5	.	٠ ت	708.1	703.1	754.34	754.00		-0.02	2001583.7	803015.4 B	80
860	ELE	1982	100	u	8	656.6	651.6	754.53	754.14		-0.07	2001583.8	803020.1 B	5 0
87	ELE	1982	30.5	.	21.5	723.3	718.3	752.15	751.75		-0.1	2001929.8	802855.0	€ 1
8 8	333 333	1982	35	u	5	717.6	712.6	750.55	749.97		-0.25	2001001.5	802311.8 W	É
89	Æ	1982	42.5	u	28.5	718.6	713.6	758.79	758.33		-0.25	2001565.9	802380.9	E
B 10	E\$E	1982	40	.	23	706.8	701.8	744.65	744.17	744.34	-0.17	2002503.4	801516.1	
810A	¥	1984	61.8	us.	•	685.3	680.3	743.93	743.78		-0.16	2002499.9	801520.5	
811	E	1982	47.3	15	28.3	715.3	710.3	761.04	760.57	760.74	-0.17	2002085.5	801929.8	
B11A	¥	1984	7.5	VA	50	686.7	681.7	759.23	758.92		-0.17	2002085.9	801924.5	
812	EAE	1982	48.9	us.	; 21	714.3	709.3	760.85	760.35	760.52	-0.17	2001588.8	801767.1	
B13		1982	32.5		12.5	708.9	703.9	739.69	739.28	739.46	-0.18	2001316.6	800990.1	
118	E	1982	15		10	704.4	4-669	717.62	716.87		-0.43	2000728.0	800694.2	
815	E	1982	40	.	24	707.3	702.3	744.88	744.47		-0.08	2002373.8	800415.1	
815R	¥	1984	43.2	u	7	703.8	698_8	746.16	743.70		-2.59	2002384.0	800534.4	
815P	M	1987	8	u	•	683.1	678.1	743.68	743.51	743.52	-0.01	2002387.2	800417.4	
816	E	1982	45.4	.	23	720.1	715.1	763.23	762.81		-0.06	2002103.7	802389.7	
8164	E	1984	69.9	u	•	695.7	690.7	762.84	762.58		-0.14	2002103.4	802384.3	
6107	M	1984	36.2	5	=	711.4	701.4	739.74	739.45		-0.13	2002777.8	8.466008	
6108	¥	7861	44.2	5	17	715.0	705.0	751.37	751.13		-0.16	2002292.1	801724.0	
6109	Ä	1984	51.7	10		717.2	707.2	760.8	760.60		-0.19	2001645.2	801760.5	
G109A	M	1984	79.5	v.	9.5	7.789	679.4	761.26	760.90	•	-0.13	2001650_4	801762.2	
6110	¥	1984	43.1	ನ	13	712.1	702.1	748.22	747.90		-0.18	2001485.2	801237.1	
6717	*	786	36.2	10	_	712.6	702.6	741.24	740.59	741.04	-0.45	2000990.7	801788.2	•
7119	£	1987	*	ř	12	727.3	717.3	763.48	763.33	763.29	0.04	2001743.3	801853.9	č

Winnebago Reclamation Landfill Elevations are in feet referenced to mean sea level (MSL) These elevations supercede those reported on well construction logs in Appendix B

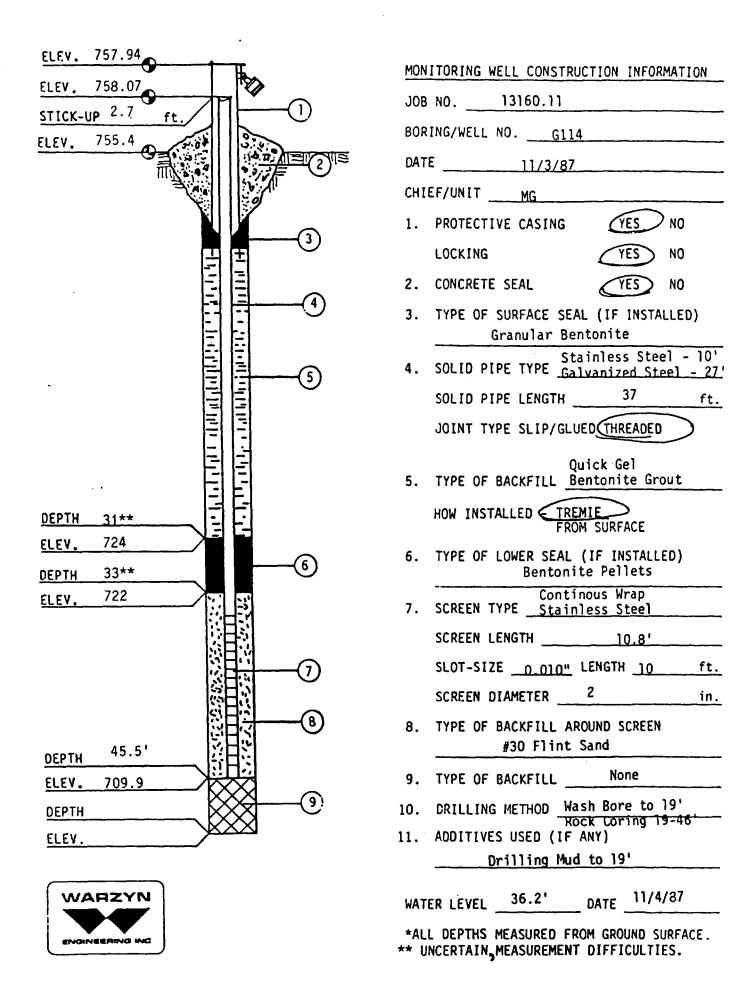
Difference between Top of Old New old Water Table=W Outer Top of Top of and new Illinois State Total Total Length Top of **Bottom** Casing Inner Inner inner Plane Coordinates Piezo (West Zone) Drilled Year Well Screen of sand Screen of Screen Elevation Casing Casing casing or clay Northing Easting well=B Drilled Depth(ft) Length(ft) Pack (ft)Elevation Elevation 8/89 **Elevation Elevation Elevations** Boring No. By 0.01 10 762.23 762.22 2001424.2 801720.9 W G113 WEI 1987 48.5 12 721.4 711.4 762.29 2001430.9 WEI 1987 75 5 12 690.0 685.0 762.85 762.86 762.89 -0.03 801714.8 B G113A 12 719.9 709.9 758.25 758.07 758.11 -0.04 2001576.1 801486.1 W 6114 WEI 1987 10 45.5 G115 WEI 21 10 13 715.9 705.9 729.3 729.03 729.03 0 2001246.0 800020.5 W 1987 707.9 697.9 713.92 713.83 713.76 0.07 2002021.0 798812.1 W G116 WEI 1987 13.5 10 11.5 2002021.5 1987 43 5 15 673.4 668.4 714.23 714.12 714.06 0.06 798806.7 B G116A WEI 707.4 G117 WEI 1987 24.5 10 16 697.4 723.61 723.42 723.25 0.17 2002550.2 799202.4 W 9 718.21 2002786.7 799607.4 B G118A WEI 1987 43 5 677.5 672.5 718.39 718.24 0.03 G118R WEI 1988 14 10 12 NA 717.93 NA 717.61 NA 2002790.5 799604.1 W G119 WEI 1987 18 10 14.5 709.5 699.5 720.44 720.34 720.22 0.12 2003118.7 799226.0 W 48 5 13 674.5 669.5 720.17 2003126.2 799230.3 B G119A WEI 1987 720.19 720.04 0.13 P1 ECJ 1984 35 5 7 695.3 690.3 728.06 727.65 727.69 -0.04 2002055.9 799343.5 B 10 P3R WEI 1987 49.2 14 708.4 698.4 749.74 749.59 749.58 0.01 2001897.3 799552.5 ¥ P4R WEI 1987 69.3 5 14 683.7 678.7 749.98 749.82 749.80 0.02 2001885.1 799555.9 B ECJ 50 5 6.5 692.0 P6 1984 687.0 740.31 739.53 739.71 -0.18 2001315.9 801016.8 B **P7** ECJ 31 1984 728.75 P8 **ECJ** 1984 36 748.77 748.12 748.18 -0.06 2001247.4 803790.9 B P9 **ECJ** 1984 51 749.12 748.60 748.67 -0.07 2001239.5 803766.6 B 100 NW-101 ECJ 1984 799.20 8 MW-102 **ECJ** 1984 54 760.64 MW-103 ECJ 1984 59.5 751.65 751.10 751.17 -0.07 2001600.2 804573.4 B MW-104 EÇJ 1984 135 757.16 756.58 756.72 -0.142000842.5 803563.5 B MW-105 **ECJ** 1984 76 10 12.5 684.7 674.7 753.47 752.89 752.82 0.07 2001584.6 803041.1 B MV-106 **ECJ** 1984 60 10 13 674.7 664.7 727.47 725.85 725.89 -0.04 2002065.6 799325.6 B MJ-107 ECJ 1984 150 750.62 749.92 749.78 0.14 2002727.9 802233.5 B

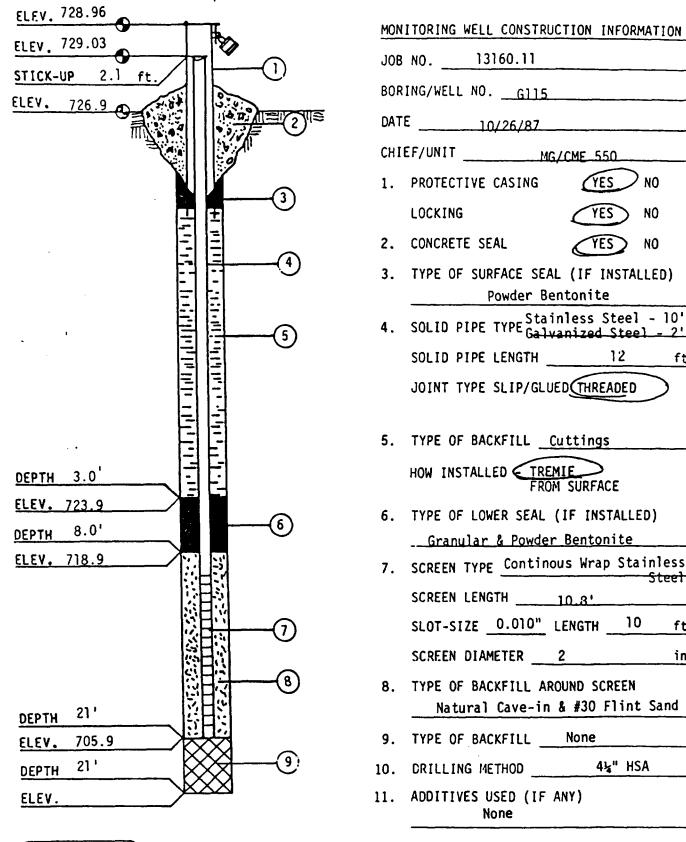






	NO. 13160.11
BOR	ING/WELL NO. G113A
DAT	30/20/07
CHI	EF/UNIT MG/CME 550
1.	PROTECTIVE CASING YES NO
	LOCKING YES NO
2.	CONCRETE SEAL YES NO
3.	TYPE OF SURFACE SEAL (IF INSTALLED)
	Granular Bentonite
4.	SOLID PIPE TYPE Stainless Steel - 40' Galvanized Steel - 32'
	SOLID PIPE LENGTH 72 ft.
	JOINT TYPE SLIP/GLUED THREADED
5.	TYPE OF BACKFILL Quick Gel Bentonite
	HOW INSTALLED TREMIE FROM SURFACE
6.	TYPE OF LOWER SEAL (IF INSTALLED)
	Bentonite Pellets
7.	Continous Wrap Stainless SCREEN TYPE Steel
	SCREEN LENGTH 5.4'
	SLOT-SIZE 0.010" LENGTH 5 ft.
	SCREEN DIAMETER 2 in.
8.	TYPE OF BACKFILL AROUND SCREEN #30 Flint Sand
	TYPE OF BACKFILL None
10.	DRILLING METHOD Wash Bore w/Mud Cased
	ADDITIVES USED (IF ANY)
	Drilling Mud 0-33'
WAT	ER LEVEL 41.3' DATE 11/2/87
*AL	L DEPTHS MEASURED FROM GROUND SURFACE.

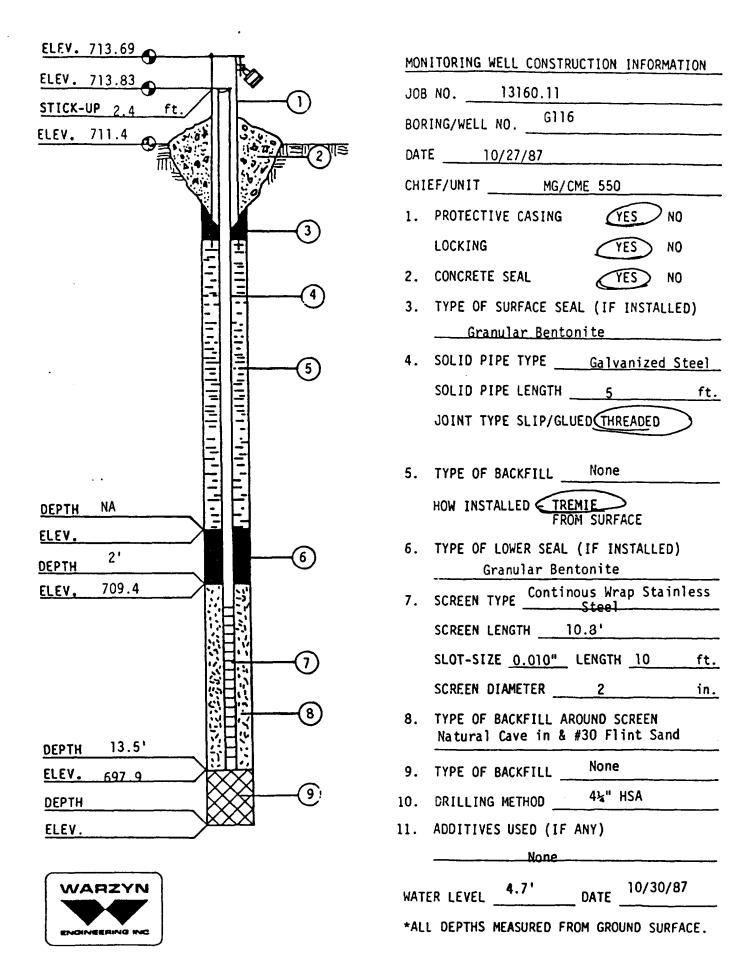


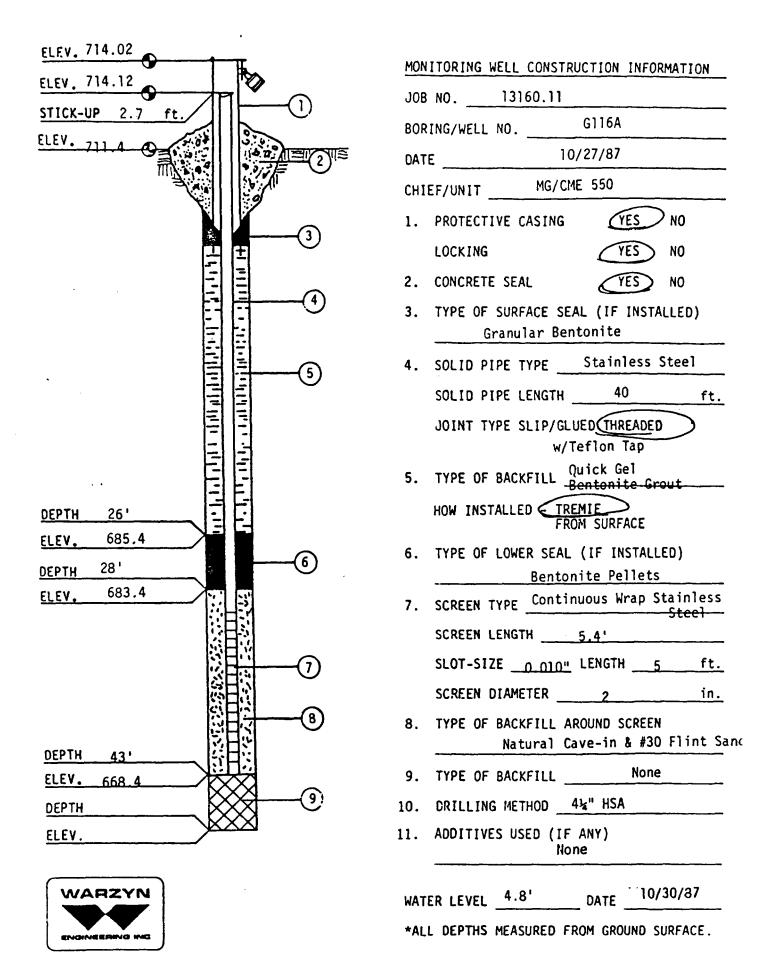


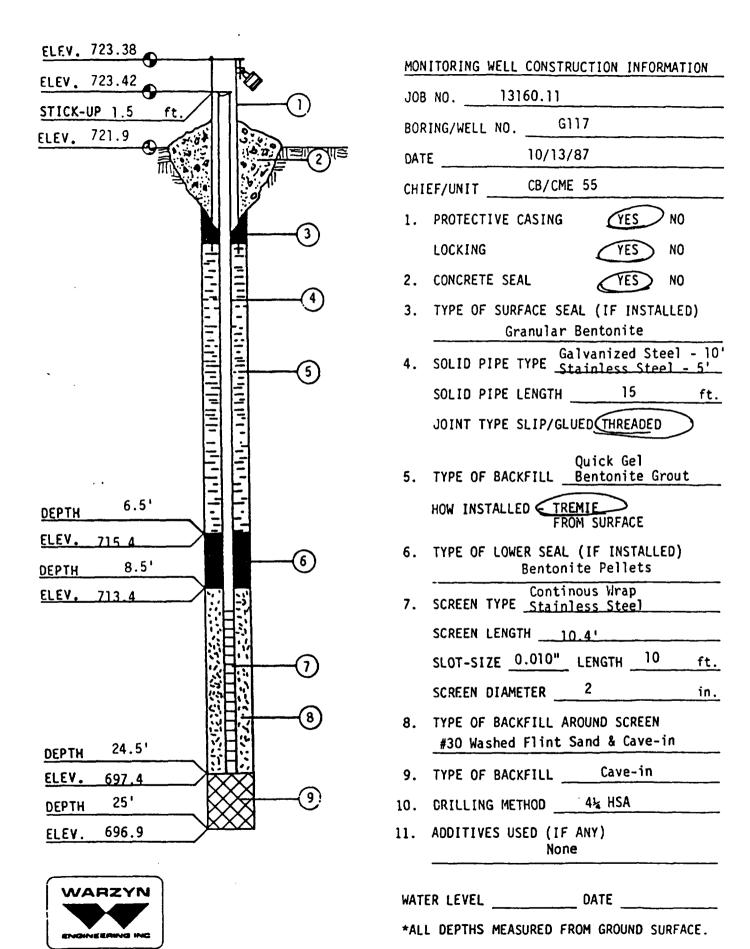
WARZYN

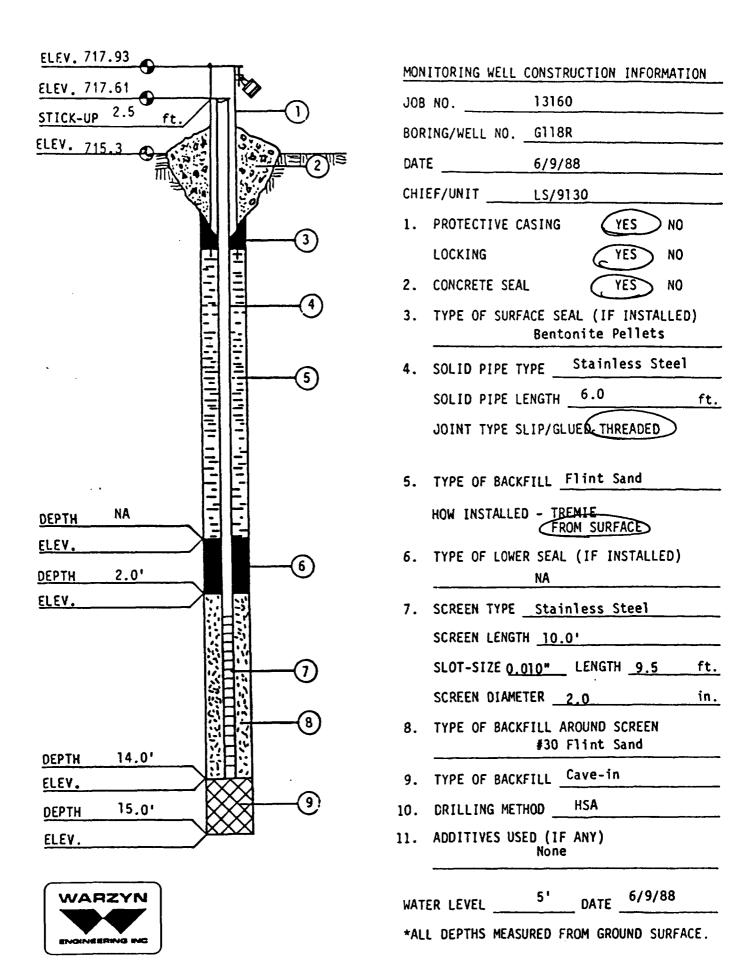
NOINEERING INC

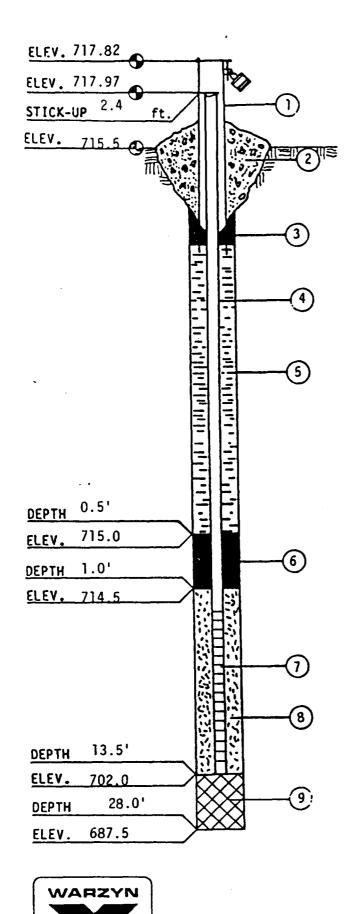
JOB	NO	13160.11		
BOR	ING/WELL	NO. <u>G115</u>		
DATE	·	10/26/87		
1.		VE CASING	YES	ON C
	LOCKING		YES	NO
2.	CONCRETE	SEAL	YES	NO
3.	TYPE OF		AL (IF INSTA	ALLED)
		Powder B		
4.	SOLID PI	PE TYPE Star	inless Stee vanized Ste	1 - 10' el - 2'
	SOLID PI	PE LENGTH _	12	ft.
	JOINT TY	PE SLIP/GLU	JED THREADE	\geq
5.	TYPE OF	BACKFILL _	Cuttings	
	HOW INSTA	ALLED TRE	MIE M SURFACE	
6.	TYPE OF	LOWER SEAL	(IF INSTALL	ED)
	Granul	ar & Powde	<u>r Bentonite</u>	
7.	SCREEN T	YPE Contin	ous Wrap St	ainless Steel
	SCREEN L	ENGTH	10.8'	
	SLOT-SIZ	E 0.010"	LENGTH 1	0 ft.
	SCREEN D	IAMETER	2	in.
8.			ROUND SCREEN	
9.	TYPE OF	BACKFILL _	None	
ιο.	DRILLING	METHOD	4½" h	ISA
1.	ADDITIVE	S USED (IF None	ANY)	
WATE	D LEVEL	-	NATE	
			DATE	
*ALI	. DEPTHS I	MEASURED FR	ROM GROUND S	SURFACE.





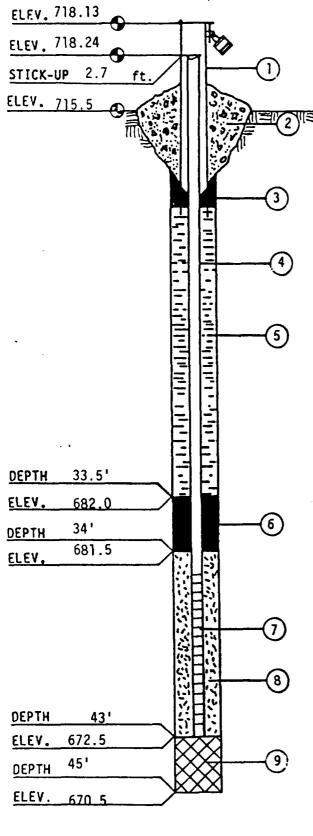






JOR	NO
	ING/WELL NO. G118
DAT	10/14/87
CHI	EF/UNIT CB/CME 55
1.	PROTECTIVE CASING YES NO
	LOCKING YES NO
2.	CONCRETE SEAL YES NO
3.	TYPE OF SURFACE SEAL (IF INSTALLED) Granular Bentonite
4.	SOLID PIPE TYPE Stainless Steel
	SOLID PIPE LENGTH 5 ft.
	JOINT TYPE SLIP/GLUED THREADED W/Teffon Tape
5.	TYPE OF BACKFILL None
	HOW INSTALLED TREMIE FROM SURFACE
6.	TYPE OF LOWER SEAL (IF INSTALLED) Bentonite Pellets
7.	SCREEN TYPE Continous Wrap Stainless Steel
	SCREEN LENGTH 10.8'
	SLOT-SIZE 0.010" LENGTH 10 ft.
	SCREEN DIAMETER 2 in.
8.	TYPE OF BACKFILL AROUND SCREEN #30 Flint Sand
9.	TYPE OF BACKFILLCave-in
10.	DRILLING METHOD 4½" HSA
11.	ADDITIVES USED (IF ANY) None
WATI	ER LEVEL 7.9' DATE 10/26/87
*ALI	L DEPTHS MEASURED FROM GROUND SURFACE.

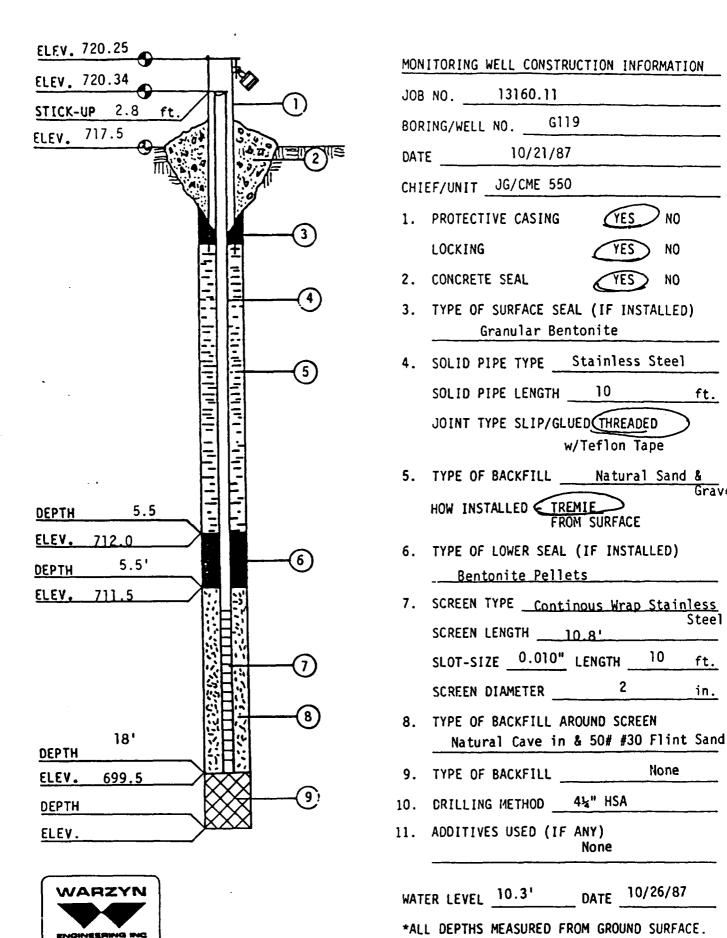
MONITORING WELL CONSTRUCTION INFORMATION



WARZYN
ENGINEERING INC

	ITORING WELL CONSTRUCTION INFORMATION
JOB	NO13160.11
BOR	ING/WELL NOG118A
DATE	10/14/87
CHIE	F/UNITCB/CME 55
1.	PROTECTIVE CASING YES NO
	LOCKING YES NO
2.	CONCRETE SEAL YES NO
3.	TYPE OF SURFACE SEAL (IF INSTALLED) Granular Bentonite
4.	SOLID PIPE TYPE Stainless Steel
	SOLID PIPE LENGTH 40 ft.
	JOINT TYPE SLIP/GLUED THREADED w/Teflon Tape
5.	TYPE OF BACKFILL Bentonite Grout
	HOW INSTALLED TREMIE FROM SURFACE
6.	TYPE OF LOWER SEAL (IF INSTALLED) Bentonite Pellets
7.	SCREEN TYPE <u>Continous Wrap Stainless</u> Steel SCREEN LENGTH <u>5.4'</u>
	SLOT-SIZE <u>n_010"</u> LENGTH <u>5</u> ft.
	SCREEN DIAMETER 2 in.
	TYPE OF BACKFILL AROUND SCREEN Natural Sand & Gravel Cave-in #50 Flint
9.	TYPE OF BACKFILL <u>Natural Cave-in</u> 3 7/8" Roller Bit 4"Casi DRILLING METHOD <u>Wash Bore</u>
	ADDITIVES USED (IF ANY)
.1.	Drilling Mud - Quick Gel
WATE	R LEVEL DATE

*ALL DEPTHS MEASURED FROM GROUND SURFACE.



(YES)

YES NO

YES

NO

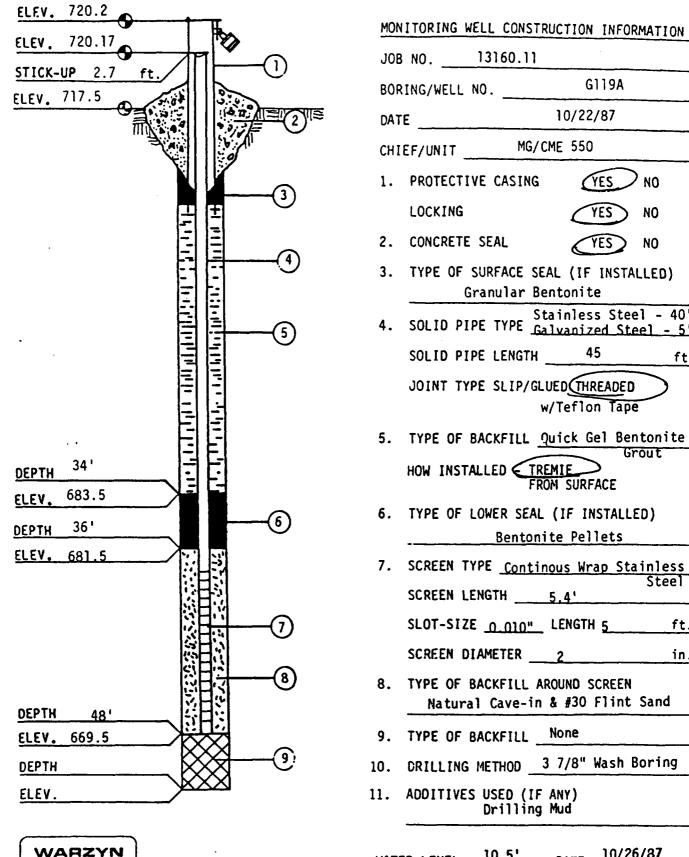
NO

ft.

ft.

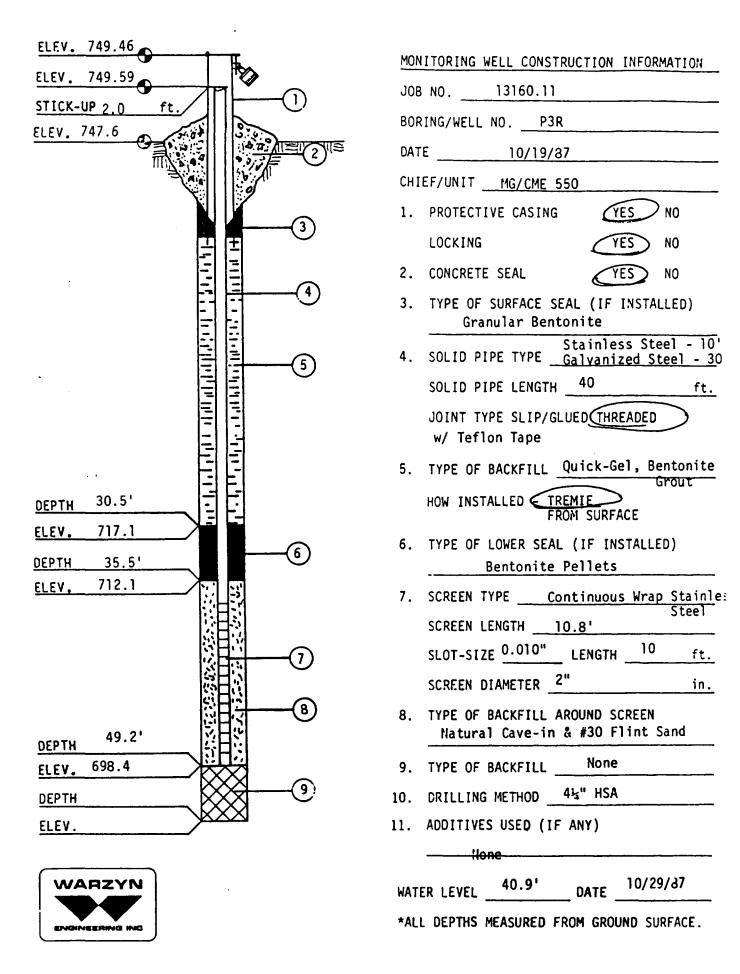
in.

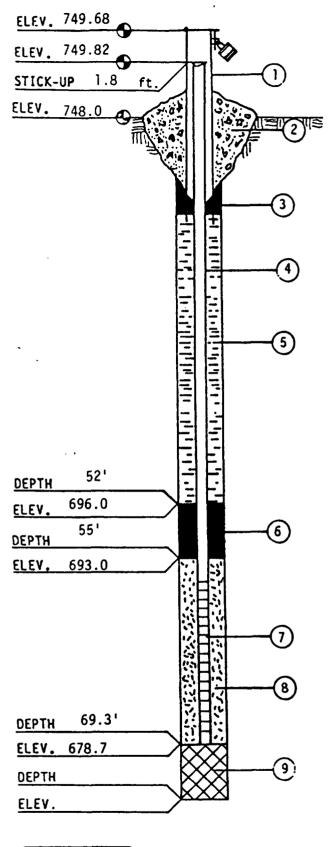
None



G119A 10/22/87 MG/CME 550 YES. NO NO NO 3. TYPE OF SURFACE SEAL (IF INSTALLED) Granular Bentonite 4. SOLID PIPE TYPE Stainless Steel - 40'
Galvanized Steel - 5' SOLID PIPE LENGTH 45 ft. JOINT TYPE SLIP/GLUED THREADED w/Teflon Tape 5. TYPE OF BACKFILL Quick Gel Bentonite HOW INSTALLED TREMIE 6. TYPE OF LOWER SEAL (IF INSTALLED) Bentonite Pellets 7. SCREEN TYPE <u>Continous Wrap Stainless</u> SCREEN LENGTH 5.4' SLOT-SIZE 0.010" LENGTH 5 ft. SCREEN DIAMETER 2 8. TYPE OF BACKFILL AROUND SCREEN Natural Cave-in & #30 Flint Sand 9. TYPE OF BACKFILL None 10. DRILLING METHOD __ 3 7/8" Wash Boring 11. ADDITIVES USED (IF ANY) Drilling Mud WATER LEVEL 10.5' DATE 10/26/37

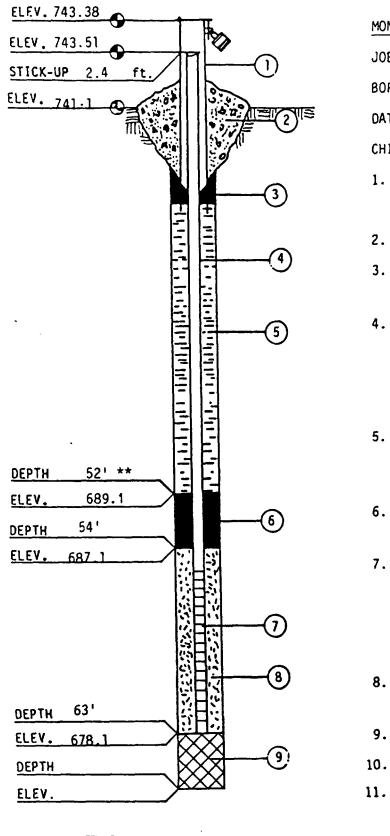
*ALL DEPTHS MEASURED FROM GROUND SURFACE.





WARZYN	
ENGINEERING INC	

MONITORING WELL CONSTRUCTION INFORMATION
JOB NO13160.11
BORING/WELL NO. PAR
DATE10/20/87
CHIEF/UNIT JG/CME 550
1. PROTECTIVE CASING YES NO
LOCKING YES NO
2. CONCRETE SEAL YES NO
3. TYPE OF SURFACE SEAL (IF INSTALLED) Granular Bentonite
4. SOLID PIPE TYPE Stainless Steel - 3 Galvanized Steel - 3 SOLID PIPE LENGTH 65' ft.
JOINT TYPE SLIP/GLUED THREADED w/Teffon Tape
5. TYPE OF BACKFILL Quick Gel, Bentonite Grout
HOW INSTALLED TREMIE FROM SURFACE
6. TYPE OF LOWER SEAL (IF INSTALLED) #25 Bentonite Pellets
7. SCREEN TYPE Continuous Wmap Stainless Steel
SCREEN LENGTH 5.4'
SLOT-SIZE 0.010" LENGTH 5 ft.
SCREEN DIAMETER 2" in.
8. TYPE OF BACKFILL AROUND SCREEN Natural Cave-in & #30 Flint Sand
9. TYPE OF BACKFILL None
O. DRILLING METHOD 3 7/8" Wash Bore w/ Muc
1. ADDITIVES USED (IF ANY) Quick Gel Drilling Mud
WATER LEVEL DATE



WARZYN

ENGINEERING INC

MONI	TORING WELL CONSTRUCTION INFORMATION
JOB	NO13160.11
BORI	NG/WELL NO. B-15P
DATE	10/15/87
CHIE	F/UNIT CB/CME 55
1.	PROTECTIVE CASING YES NO
	LOCKING YES NO
2.	CONCRETE SEAL YES NO
3.	TYPE OF SURFACE SEAL (IF INSTALLED)
	Granular Bentonite
4.	SOLID PIPE TYPE Stainless Steel - 40' Galvanized Steel - 20'
	SOLID PIPE LENGTH 60 ft.
	JOINT TYPE SLIP/GLUED THREADED
	w/Teflon Tape
5.	TYPE OF BACKFILL Quick Gel, Bentonite
	HOW INSTALLED TREMIE FROM SURFACE
6.	TYPE OF LOWER SEAL (IF INSTALLED)
	Bentonite Pellets
7.	SCREEN TYPE Continuous Wrap Stainless Steel
	SCREEN LENGTH 5.4'
	SLOT-SIZE 0.010" LENGTH 5 ft.
	SCREEN DIAMETER 2" in.
8.	TYPE OF BACKFILL AROUND SCREEN Cave-in & #30 Flint Sand
9.	TYPE OF BACKFILL None
10.	CRILLING METHOD Wash Bore 3 7/8" Roller
1.	ADDITIVES USED (IF ANY)
	Drilling Mud Quick Gel Bentonite
WATE	R LEVEL DATE
*ALL	DEPTHS MEASURED FROM GROUND SURFACE. UNCERTAIN, MEASUREMENT DIFFICULTIES.

APPENDIX C ANALYTICAL LABORATORY RESULTS

	TARGET COMPOUND LISTS	
•		

GC/MS METHOD CLP TARGET COMPOUND LIST AND DETECTION LIMITS

			Detection	n Limits ⁽¹⁾
			Water(2)	Low Soil 3) Sediment(3)
Volat	iles	CAS Number	ug/1	ug/kg
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
		75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene Chloride	75-09-2	5	5
6.	Acetone	67-64-1	10	10
	Carbon Disulfide	75-15-0	5	5
8.	1,1-Dichloroethene	75-35-4	5	5
	1,1-Dichloroethane	75-35-3	5 5	5 5 5 5
10.	trans-1,2-Dichloroethene	156-60-5	5	
11.	Chloroform	67-66-3	5	5
12.	1,2-Dichloroethane	107-06-2	5	5
13.	2-Butanone	78-93-3	10	10
	1,1,1-Trichloroethane	71-55-6	5	5
15.	Carbon Tetrachloride	56-23-5	5	5
16.	Vinyl Acetate	108-05-4	10	10
17.		75-27-4	5	5 5 5 5
18.	1,1,2,2-Tetrachloroethane	79-34-5	5 5 5 5	5
19.		78-87-5	5	5
20.	trans-1,3-Dichloropropene	10061-02-6	5	
21.	Trichloroethene	79-01-6	5 5 5 5	5 5 5 5
22.	Dibromocloromethane	124-48-1	5	5
	1,1,2-Trichloroethane	79-00-5	5	5
24.	Benzene	71-43-2	5	5
25.	cis-1,3-Dichloropropene	10061-01-5	5	5
26.	2-Chloroethyl Vinyl Ether	110-75-8	10	10
27.	Bromoform	75-25-2	5	5
28.	2-Hexanone	591-78-6	10	10
29.		108-10-1	10	10
30.	Tetrachloroethene	127-18-4	5	5
31.	Toluene	108-88-3	5 5 5	5 5 5 5
32.	Chlorobenzene	108-90-7	5	5
33.	Ethyl Benzene	100-41-4	5	5
34.	Styrene	100-42-5	5	5
35.	Total Xylenes		5	5

			Detection	Limits(1)
Semi-	-Volatiles	CAS Number	Low Water(4) ug/l	Sediment(5) ug/kg
36. 37. 38. 39.	Phenol bis(2-Chloroethyl)ether 2-Chlorophenol 1,3-Dichlorobenzene 1,4-Dichlorobenzene	108-95-2 111-44-4 95-57-8 541-73-1 106-46-7	10 10 10 10 10	330 300 330 330 330
41. 42. 43. 44. 45.	Benzyl Alcohol 1,2-Dichlorobenzene 2-Methylphenol bis(2-Chloroisopropyl)ether 4-Methylphenol	100-51-6 95-50-1 95-48-7 39638-32-9 106-44-5	10 10 10 10 10	330 330 330 330 330
46. 47. 48. 49. 50.	N-Nitroso-Dipropylamine Hexachloroethane Nitrobenzene Isophorone 2-Nitrophenol	621-64-7 67-72-1 98-95-3 78-59-1 88-75-5	10 10 10 10 10	330 330 330 330 330
51. 52. 53. 54. 55.	2,4-Dimethylphenol Benzoic Acid bis(2-Chloroethoxy)methane 2,4-Dichlorophenol 1,2,4-Trichlorobenzene	105-67-9 65-85-0 111-91-1 120-83-2 120-82-1	10 50 10 10	330 1600 330 330 330
56. 57. 58. 59.	Naphthalene 4-Chloroaniline Hexachlorobutadiene 4-Chloro-3-methylphenol (para-chloro-meta-cresol) 2-Methylnaphthalene	91-20-3 106-47-8 87-68-3 59-50-7	10 10 10 10	330 330 330 330 330
61. 62. 63. 64.	Hexachlorocyclopentadiene 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 2-Chloronaphthalene 2-Nitroaniline	77-47-4 88-06-2 95-95-4 91-58-7 88-74-4	10 10 50 10 50	330 330 1600 330 1600
66. 67. 68. 69. 70.	Dimethyl Phthalate Acenaphthylene 3-Nitroaniline Acenaphthene 2,4-Dinitrophenol	131-11-3 208-96-8 99-09-2 83-32-9 51-28-5	10 10 50 10 50	330 330 1600 330 1600
71. 72. 73. 74. 75.	4-Nitrophenol Dibenzofuran 2,4-Dinitrotoluene 2,6-Dinitrotoluene Diethylphthalate	100-02-7 132-64-9 121-14-2 606-20-2 84-66-2	50 10 10 10 10	1600 330 330 330 330

			Detection	n Limits ⁽¹⁾
Semi-	-Volatiles	CAS Number	Low Water(4) ug/1	Low Soil Sediment ⁽⁵⁾ ug/kg
76. 77. 78. 79. 80.	4-Chlorophenyl Phenyl ether Fluorene 4-Nitroaniline 4,6-Dinitro-2-methylphenol N-nitrosodiphenylamine	7005-72-3 86-73-7 100-01-6 534-52-1 86-30-6	10 10 50 50 10	330 330 1600 1600 330
81. 82. 83. 84.	4-Bromophenyl Phenyl ether Hexachlorobenzene Pentachlorophenol Phenanthrene Anthracene	101-55-3 118-74-1 87-86-5 85-01-8 120-12-7	10 10 50 10 10	330 330 1600 330 330
86. 87. 88. 89.	Di-n-Butylphthalate Fluoranthene Pyrene Butyl Benzyl Phthalate 3,3'-Dichlorobenzidine	84-74-2 206-44-0 129-00-0 85-68-7 91-94-1	10 10 10 10 20	330 330 330 330 660
91. 92. 93. 94. 95.	Benzo(a)anthracene bis(2-ethylhexyl)phthalate Chrysene Di-n-octyl Phthalate Benzo(b)fluoranthene	56-55-3 117-81-7 218-01-9 117-84-0 205-99-2	10 10 10 10 10	330 330 330 330 330
96. 97. 98. 99.	Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	207-08-9 50-32-8 193-39-5 53-70-3 191-24-2	10 10 10 10 10	330 330 330 330 330

.

			Detection	n Limits(1)
			Low Water(6)	Low Soil (7) Sediment (7)
Pesti	cides	CAS Number	ug/1	ug/kg
				
101.	alpha-BHC	319-84-6	0.05	8.0
102.	beta-BHC	319-85-7	0.05	8.0
103.	delta-BHC	319-86-8	0.05	8.0
104.	gamma-BHC (Lindane)	58-89-9	0.05	8.0
105.	Heptachlor	76-44-8	0.05	8.0
106.	Aldrin	309-00-2	0.05	8.0
107.	Heptachlor Epoxide	1024-57-3	0.05	8.0
108.	Endosulfan I	959-98-8	0.05	8.0
109.	Dieldrin	60-57-1	0.10	16.0
110.	4,4'-DDE	72-55-9	0.10	16.0
111.	Endrin	72-20-8	0.10	16.0
112.	Endosulfan II	33213-65-9	0.10	16.0
113.	4.4-000	72-54-8	0.10	16.0
114.	Endosulfan Sulfate	1031-07-8	0.10	16.0
115.	4,4'-DDT	50-29-3	0.10	16.0
116.	Endrin Ketone	53494-70-5	0.10	16.0
117.	Methoxychlor	72-43-5	0.5	80.0
118.	Chlordane	57 - 74 - 9	0.5	80.0
119.	Toxaphene	8001-35-2	1.0	160.0
120.	AROCLOR-1016	12674-11-2	0.5	80.0
121.	AROCLOR-1221	11104-28-2	0.5	80.0
122.	AROCLOR-1232	11141-16-5	0.5	80.0
123.	AROCLOR-1242	53469-21-9	0.5	80.0
124.	AROCLOR-1248	12672-29-6	0.5	80.0
125.	AROCLOR-1254	11097-69-1	1.0	160.0
126.	AROCLOR-1260	11096-82-5	1.0	160.0

Notes:

- (1) Detection limits listed for soil/sediment are based on wet weight. The detection limits calculated by the laboratory for soil/sediment will be on dry weight basis and will be higher.
- (2) Medium Water Detection Limits (DL) for Volatile CLP Target Compounds are 100 times the individual Low Water RDL.
- (3) Medium Soil/Sediment DL for Volatile CLP Target Compounds are 100 times the individual Low Water DL.
- (4) Medium Water DL for Semi-Volatile CLP Target Compounds are 100 times the individual Low Water DL.
- (5) Medium Soil/Sediment DL for Semi-Volatile CLP Target Compounds are 60 times the individual Low Soil/Sediment DL.
- (6) Medium Water DL for Pesticide CLP Target Compounds are 100 times the individual Low Water DL.
- (7) Medium Soil/Sediment DL for Pesticide CLP Target Compounds are 15 times the individual Low Soil/Sediment DL.
 - * Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

[cac-79-13]

Hazelton GC Method Parameter List

Chloromethane Vinyl Chloride Chloroethane Bromomethane 1,1-Dichloroethene **Dichloromethane** trans-1,2-Dichloroethene 1,1-Dichloroethane cis-1,2-Dichloroethene Chloroform 1,1,1-Trichloroethane Carbon tetrachloride 1,2-Dichloroethane Trichloroethene 1,2-Dichloropropane Bromodichloromethane 2-Chloroethylvinyl ether cis-1,3-Dichloropropene trans-1,2-Dichloropropene 1,1,2-Trichloroethane Tetrachloroethene Dibromochloromethane Chlorobenzene Bromoform 1,1,2,2-Tetrachloroethane 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene Benzene Toluene Ethylbenzene m and p-Xylene o-Xylene Styrene

V160R08JAH PARAMETER LIST

ELEMENTS DETERMINED BY INDUCTIVELY COUPLED PLASMA EMISSION OR ATOMIC ABSORPTION (AA) SPECTROSCOPY

Metal:	Required Detection Level (ug/l)
Alumium	200
Antimony	60
Arsenic	10
Barium	200
Beryllium	5
Cadmium	5
Calcium	5000
Chromium	10
Cobalt	50
Copper	25
Iron	100
Lead	5
Magnesium	5000
Manganese	15
Mercury	0.2
Nickel	40
Potassium	5000
Selenium	
Silver	10
Sodium	5000
Thallium	10
Vanadium	50
Zinc	20

Attachment 1

QUALITY CONTROL REQUIREMENTS FOR ANALYSES PERFORMED
BY WARZYN AT PAGEL'S PIT LANDFILL

PARAMETER	AUDIT	FREQUENCY*	LIMITS
Amenda	Lab blank	1	(0.005 == /l
Arsenic	Lab Diank	1 per set	<0.005 mg/L
	Duplicate	1 per 10	10% or <0.005 mg/L
	Calibration check STD	1 per 10 and end of run	90-110% recovery
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference	1 per set	95% confidence interval
	STD		
Barium	Lab blank	1 per set	<0.010 mg/L
	Duplicate	1 per 10	10% or <0.005 mg/L
	Calibration check STD	1 per 10 and end of run	90-110% recovery
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference STD	1 per set	85-115% recovery
Cadmium	Lab blank	1 per set	<0.0005 mg/L
	Duplicate	1 per 10	10% or <0.005 mg/L
	Calibration check STD	1 per 10 and end of run	90-110% recovery
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference	1 per 10	95% confidence interval
	STD		

QUALITY CONTROL REQUIREMENTS FOR ANALYSES PERFORMED BY WARZYN AT PAGEL'S PIT LANDFILL

Chloride	Indicator blank	1 per set	<0.25 ml titrant
	Titrant standard- ization	2 per titrant solution	<5% RPD
	Check standard	1 per 10 and end of run	90-110% recovery
	Duplicate	1 per 10	<10% or 1 mg/L
	Matrix spike	1 per 10	85-115% recovery
,	EPA QC Reference Standard	1 per set	95% confidence interval
	•		
Total Alkalinity	Titrant standard- ization	Daily - 2 per titrant solution	<5% RPD
	Lab Blank	1 per set	<5 mg/L
	Check standard	1 per 10 and end of run	90-110% recovery
	Duplicate	1 per 10	10% or <10 mg/L
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference STD	1 per set	95% confidence interval
Total Phenolics	Lab blank	1 per set	<0.005 mg/L
	Duplicate	1 per 10	10% or <0.005 mg/L
<u>.</u>	Calibration check STD	1 per 10 and end of run	90-110% recovery
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference STD	1 per set	95% confidence interval

QUALITY CONTROL REQUIREMENTS FOR ANALYSES PERFORMED BY WARZYN AT PAGEL'S PIT LANDFILL

Total Cyanide	Lab blank	1 per set	< 0.005 mg/L
	Duplicate	1 per 10	10% or <0.005 mg/L
	Calibration check STD	1 per 10 and end of set	85-115% recovery
	Matrix spike	1 per 10	85-115% recovery
	EPA QC Reference	1 per set	95% confidence
	OTZ		interval

^{*}Frequencies apply to each matrix individually.

RCW/mml/KDF [mml-108-88a] 12660.08

APPENDIX C

The following appendix lists results of analyses performed on samples collected at and in the vicinity of the Winnebago Reclamation Landfill. Values are reported where measurement methods used provided measurable quantities of target analytes. Where target compounds were not detected, spaces are left blank.

COMPOUND GROUP DESIGNATIONS

The following group designations are used within tables in this appendix.

VOC Volatile Organic Compounds

SVOC Semi-Volatile Organic Compounds

P/PCB Pesticides and PCBs

MTL Metals and Cyanide

IND Indicator Parameters

TVOA Tentatively Identified Volatile Organic Compounds

TBNA Tentatively Identified Semi-Volatile Organic Compounds

Lists of target compounds making up the VOC, SVOC, P/PCB and MTL groupings are attached.

DATA QUALIFIER DEFINITIONS

The following defines symbols used in qualifying results of analyses. Results may have been qualified by the performing laboratory or as part of data validation. If data are qualified, the qualifiers are presented with results. For results of groundwater analyses, the data validation qualifier (DVQ) and laboratory qualifier (LQ) are presented together, separated by a slash (i.e., DVQ/LQ). For other analyses, the data qualifiers are presented separately.

Data Qualifiers for Organics Analyses and Indicator Parameters

- U The material was analyzed for, but not detected. The associated numerical value is the estimated sample quantitation limit.
- J The associated numerical value is an estimated quantity because quality control criteria were not met.
- R Quality control indicates that the data are unusable (compound may or may not be present).

- Q No analytical result.
- N Presumptive evidence of the presence of the material (tentative identification).

Data Qualifiers for Inorganics Analyses

- 'U Indicates that the element was analyzed for but not detected.
- E Indicates a value estimated but not reported due to the presence of interferences.
- s Indicates value determined by Method of Standard Addition.
- N Indicates spike sample recovery is not within control limits.
- * Indicates duplicate analysis was not within control limits.
- + Indicates the correlation coefficient for method of standard additions is less than 0.995.
- M Indicates duplicate results exceed control limits.

X - manually quantilized

D - diluted sample

E - exceeded calibration range

DATA QUALIFIER DEFINITIONS

The following qualifiers are used by data validation personnel. The code letters are listed below with associated definitions.

INORGANIC

- U The material was analyzed for, but was not detected.
- J The associated numerical value is an estimated quantity because quality control criteria were not met.
- R Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
- Z No analytical result.
- UJ Sample was analyzed, but not detected. The associated numeric value is an estimated quantity because quality control criteria were not met.
- B Found in blank.

ORGANIC

- U The material was analyzed for, but was not detected.
- J The associated numerical value is an estimated quantity.
- R The data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
- N Presumptive evidence of presence of material.
- NJ Presumptive evidence of the presence of the material at an estimated quantity.
- UJ The material was analyzed for, but was not detected. The associated numeric value is an estimated quantity because quality control criteria were not met.

LABORATORY QUALIFIER DEFINITIONS

The following qualifiers are used by laboratories performing the analyses. The 7 qualifiers defined below are not subject to modification by the laboratory.

INORGANIC

- [] -*If the result is a value greater than or equal to the instrument detection limit but less than the contract-required detection limit, report the value in brackets (i.e., [10]).
 - U -Indicates element was analyzed for but not detected. Report with the instrument detection limit value (e.g., 10U).
 - Indicates a value estimated or not reported due to the presence of interference. Explanatory note included on F cover page.
 - S -Indicates value determined by Method of Standard Addition.
 - N -Indicates spike sample recovery is not within control limits.
 - Indicates duplicate analysis is not within control limits.
 - Indicates the correlation coefficient for method of standard addition is less than 0.995.
 - M -Indicates duplicate injection results exceeded control limits.
 - Post-digestion spike for Furnace AA analysis is out of W control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

METHOD QUALIFIER (Enter):

- "P" for ICP
- "A" for Flame AA
- "F" for Furnace AA
 "CV" for Manual Cold Vapor AA
- "AV" for Automated Cold Vapor AA
 "AS" for Semi-Automated Spectrophotometric
- "C" for Manual Spectrophotometric
- "T" for Titrimetric
 "NR" if the analyte is not required to be analyzed
- The [] symbol has been replaced in the new SOW with the symbol "B" for brackets.

LAB QUALIFIERS (cont'd)

ORGANICS

)

- U Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For example, 10U for phenol in water if the sample final volume is the protocol-specified final volume. If a 1 to 10 dilution of extract is necessary, the reported limit is 100 U. For a soil sample, the value must also be adjusted for percent moisture.
- J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.
- C This flag applies to pesticide results where the GC identification has been confirmed by GC/MS. Single component pesticides ≥ 10 ng/ul in the final extract shall be confirmed by GC/MS.
- B This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified TCL compound.
- E This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged with an "E" on the Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses shall be reported on separate Forms I. The form I for the diluted sample shall have the "DL" suffix appended to the sample number.
- D This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and <u>all</u> concentration values reported on that Form I are flagged with the "D" flag.

LAB QUALIFIERS (cont'd)

ORGANICS (cont'd)

- A This flag indicates that a TIC is a suspected aldol-condensation product.
- X Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the Case Narrative. If more than one is required, use "Y" and "Z", as needed. If more than five qualifiers are required for a sample result, use the "X" flag to combine several flags, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

ROUND 1 GROUNDWATER RESULTS

RESULTS OF pH AND SPECIFIC CONDUCTANCE MEASUREMENTS FOR ROUND 1 SAMPLES

<u>Sample</u>	рH	Conductivity	Sample	рΗ	Conductivity
		umho/cm			umho/cm
<u>Leachate</u>					
	7 07	. 50. 000	0110	7.04	1210
LLA1	7.27	>50,000	G112	7.04	1310
LLE7	7.54	27,100	G113	6.87	1680
LLF1	7.75	26,200	G113A	6.89	1430
LLK2	7.66	24,200	G114	6.57	1550
LLMHWEST	7.54	19,900	G115	6.68	1510
			G116	7.06	530
			G116A	6.95	780
<u>Groundwater</u>			G117	7.04	780
B10	7.14	1230	G118		
B11	7.07	680	G118A	7.37	410
B11A	7.15	840	G119	7.43	460
B 9	7.73	600	G119A	7.10	600
B12	6.69	1550	MW105	7.64	640
B13	6.84	1180	MW106	6.45	3310
B14	7.63	630	P1	6.41	2200
B15	6.99	4390	P3R	7.04	1010
B15P	7.52	660	P4R	7.57	1380
B15R	7.10	4130	P6	7.47	640
B16	7.50	660	P7	7.15	900
B16A	7.73	590			
B 4	7.27	860	<u>Private We</u>	11	
B6D	7.59	570	PW1	7.25	660
B6S	7.56	650			
B7	7.46	730	Surface Wa	ter	
G107	7.31	690	SW1	7.86	570
G109	6.67	1410	SW2	7.75	620
G108	6.70	1010	SW3	7.88	610
G109A	7.08	1640	SW4	7.81	600
G110	6.95	1420	SW5	7.89	610
G111		••			
~~~					

V160R08JAH

	SAMPLE ID: SAMPLE DATE:	PP-804-01 4/05/88	PP-806D-01 4/07/88	PP-806S-01 4/07/88	PP-807-01 4/07/88	PP-809-01 4/05/88	PP-B10-01 4/06/88
COMPOUNDS	<u>UNIT</u>						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	553.00 9.00	273.00 10.00	287.00 23.00	321.00 23.00	294.00 4.00 9.00	438.00 15.00

	SAMPLE ID: SAMPLE DATE:	PP-B11-01 4/07/88	PP-811A-01 4/07/88	PP-811A-91 4/07/88	PP-812-01 4/06/88	PP-B13-01 4/06/88	PP-B14-01 4/05/88
COMPOUNDS	UNIT						
Alkalinity Chioride Phenol	mg/l mg/l ug/l	379.00 5.00	463.00 9.00	460.00 9.00	910.00 22.00 12.00	647.00 28.00	289.00 10.00

	SAMPLE ID: SAMPLE DATE:	PP-815-01 4/08/88	PP-815P-01 4/05/88	PP-815R-01 4/05/88	PP-B16-01 4/07/88	PP-B16A-01 4/07/88	PP-G107-01 4/06/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/t mg/t ug/t	1270.00 609.00 25.00	297.00 14.00	1130.00 477.00 6.00	311.00 19.00	245.00 16.00	377.00 20.00 5.00 J/

	SAMPLE ID: SAMPLE DATE:	PP-G107-91 4/06/88	PP-G108-01 4/07/88	PP-G109-01 4/06/88	PP-G109A-01 4/06/88	PP-G110-01 4/06/88	PP-G112-01 4/06/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	364.00 20.00	609.00 9.00	848.00 28.00	844.00 62.00	533.00 166.00 10.00	569.00 29.00

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G113-01 4/06/88	PP-G113A-01 4/06/88	PP-G114-01 4/06/88	PP-G115-01 4/05/88	PP-G116-01 4/05/88	PP-G116A-01 4/05/88
COMPOUNDS	TINU						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	881.00 30.00 9.00 J/	800.00 30.00	855.00 42.00 6.00 J/	816.00 40.00	253.00 7.00	313.00 41.00

	SAMPLE ID: SAMPLE DATE:	PP-G116A-91 4/05/88	PP-G117-01 4/05/88	PP-G118A-01 4/05/88	PP-G119-01 4/04/88	PP-G119A-01 4/04/88	PP-MW105-01 4/07/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	303.00 40.00	395.00 28.00	273.00 12.00	282.00 3.00	272.00 12.00	260.00 17.00

	SAMPLE ID: SAMPLE DATE:	PP-HU106-01 4/05/88	PP-P1-01 4/05/88	PP-P3R-01 4/05/88	PP-P4R-01 4/05/88	PP-P4R-91 4/05/88	PP-P6-01 4/06/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	1030.00 430.00 8.00	668.00 252.00	494.00 47.00 6.00	559.00 149.00 6.00	531.00 152.00	273.00 16.00

	SAMPLE ID: SAMPLE DATE:	PP-P7-01 4/05/88	PP-PW1-01 4/08/88	PP-PW1-91 4/08/88	
COMPOUNDS	TIMU				
Alkalinity Chloride Phenol	mg/l mg/l ug/l	444.00 44.00	270.00 11.00	282.00 11.00	

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

SAMPLE I SAMPLE D		PP-804-01 4/05/88	PP-8060-01 4/07/88	PP-806S-01 4/07/88	PP-B07-01 4/07/88	PP-809-01 4/05/88	PP-B10-01 4/06/88
COMPOUNDS	UNIT						
Chloromethane	ug/l	5.00					
Vinyl Chloride	ug/l	3.00					
Chloroethane	ug/l						
Methylene Chloride	ug/l		5.20	5.21	9.81 R/		
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	190.00 J/		•			0.91 J/
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	3.20					
1,1,1-Trichloroethane	ug/l	310.00 J/		0.59	0.50		1.80 J/
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	5.70					0.32 J/
Trichloroethene	ug/l	380.00 J/					3.10 J/
Dibromochloromethane	ug/l						
1,1,2-Trichtoroethane	ug/l	0.78					
Benzene	ug/l	3.60 J/					
trans-1,3-Dichloroprope							0.52 J/
Bromoform	ug/l						
Tetrachloroethene	ug/l	550.00 J/					2.50 J/
1,1,2,2-Tetrachloroetha	ne ug/l			0.28			
Toluene	ug/l	3.00 J/					
Chlorobenzene	ug/l						
Ethylbenzene	ug/l	11.00 J/					
No Compounds Detected	ug/l					0.00	
trans-1,2-Dichloroether	e ug/l						
cis-1,2-Dichloroethene	ug/l	1200.00 J/	6.60		0.40		18.00 J/
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l	9.70 J/					
o-Xylene	ug/l	24.00 1/					
1,2-Dichlorobenzene	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

	PLE ID: PLE DATE:	PP-B11-01 4/07/88	PP-B11A-01 4/07/88	PP-B11A-91 4/07/88	PP-B12-01 4/06/88	PP-B13-01 4/06/88	PP-814-01 4/15/88
COMPOUNDS	UNIT						
Chloromethane ·	ug/l						
Vinyl Chloride	ug/l				28.20 J/	33.00 J/	
Chloroethane	ug/l		3.00	2.90	11.00 J/	19.00 J/	
Methylene Chloride	ug/l		4.36	4.93			
1,1-Dichloroethene						0.22 J/	
1,1-Dichloroethane	ug/l		1.95	2.40	12.70 J/	17.00 J/	
Chloroform	ug/l						
1,2-Dichloroethane	•				1.87 J/	2.00 J/	
1,1,1-Trichloroeth		0.38	1.38	1.37		4.90 J/	
Carbon Tetrachlori							
Bromodichlorometha	ne ug/l						
1,2-Dichtoropropan	e ug/i				9.89 J/	7.10 J/	
Trichloroethene	ug/l		3.00	2.99	7.30 J/	30.00 J/	
Dibromochlorometha	ne ug/l						
1,1,2-Trichloroeth	ane ug/l						
Benzene	ug/l				1.97 J/	2.40 J/	
trans-1,3-Dichloro	propene ug/i				0.44 J/	0.48 J/	
Bromoform	ug/l						
Tetrachloroethene	ug/l	1.06			5.56 J/	17.00 J/	
1,1,2,2-Tetrachlor	oethane ug/l		5.68	5.49			
Toluene	ug/l					1.60 J/	
Chlorobenzene	ug/l				3.79 J/	2.40 J/	
Ethylbenzene	ug/l					·	
No Compounds Detec	ted ug/l						0.00
trans-1,2-Dichloro					2.75 J/	2.30 J/	
cis-1,2-Dichloroet		0.59	11.10	10.00	93.60 J/	160.00 J/	
1,4-Dichlorobenzen					17.60 J/	7.60 J/	
m and p-Xylene	ug/l					,	
o-Xylene	ug/l					2.10 J/	
1,2-Dichlorobenzen					2.35 J/	2	
I,E DIGHTOI ODEHZER	e ug/t				2.33 1/		

	IPLE ID: IPLE DATE:	PP-815-01 4/08/88	PP-815P-01 4/05/88	PP-B15R-01 4/05/88	PP-816-01 4/07/88	PP-B16A-01 4/07/88	PP-G107-01 4/06/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l			5.00 J/			
Chloroethane	ug/l	7.30		11.00 J/			
Methylene Chloride						9.44	
1,1-Dichloroethene							
1,1-Dichloroethane	e ug/l	1.94	1.31	6.37 J/	1.10	0.92	
Chloroform	ug/l				0.37		
1,2-Dichloroethane	e ug/l	0.23					
1,1,1-Trichloroeth	nane ug/l		3.57		2.70	2.02	0.45 J/
Carbon Tetrachlori	ide ug/l						
Bromodichlorometha	ine ug/l			•			
1,2-Dichloropropan	ne ug/l	3.14		4.71 J/			
Trichloroethene	ug/l	0.58	4.68	4.88 J/	2.50	1.77	0.27 J/
Dibromochlorometha	ane ug/l						
1,1,2-Trichloroeth	nane ug/l						
Benzen <del>e</del>	ug/l	3.93 ]/		3.34 J/			
trans-1,3-Dichloro	propene ug/l				0.66		
Bromoform	ug/l						
Tetrachloroethene	ug/l		2.50	1.30 J/	2.10		
1,1,2,2-Tetrachlor	oethane ug/l					1.24	
Toluene	ug/l	1.62 J/					
Chlorobenzene	ug/l	2.63					
Ethylbenzene	ug/l	2.84 1/					
No Compounds Detec	ted ug/l						
trans-1,2-Dichloro							
cis-1,2-Dichloroet			10.10	11.60 J/	25.30	31.50	1.94 J/
1,4-Dichlorobenzer	ne ug/l	13.30 J/		3.75 J/			
m and p-Xylene	ug/l	1.39 J/		1.29 J/			
o-Xyl ene	ug/l	2.00 3/		1.67 J/			
1,2-Dichlorobenzer	ne ug/l	2.52 J/		0.14 J/			

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE 1 SAMPLE D		PP-G107-91 _4/06/88	PP-G108-01 4/07/88	PP-G109-01 4/06/88	PP-G109A-01 4/06/88	PP-G110-01 4/06/88	PP-G112-01 4/06/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/t		0.98	6.50	14.40	0.20 NR/E	0.40 J/
Chloroethane	ug/l		2.10	3.70	16.50	0.20 NR/E	0.80 J/
Methylene Chloride	ug/l	15.40		10.50	4.62		
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l		1.75	4.96	22.40	42.50 J/	
Chloroform	ug/l						
1,2-Dichloroethane	ug/l				0.46	4.07 J/	
1,1,1-Trichloroethane	ug/l	0.24	2.57		0.55		
Carbon Tetrachloride	ug/l						
Promodich Loromethane	ug/l						
1,2-Dichloropropane	ug/l		0.75	3.67	5.12	8.99 J/	
richloroethene	ug/l	0.50	5.14	1.51	27.60	8.20 J/	
ibromochloromethane	ug/l						
,1,2-Trichloroethane	ug/l						
lenzene	ug/l				2.98 J/	15.10 J/	
rans-1,3-Dichloroprope	ne ug/l						
romoform	ug/l						
etrachloroethene	ug/l	0.27	5.63	3.30		0.72 J/	0.65 J/
1,1,2,2-Tetrachloroetha	ne ug/l				18.90		
oluene	ug/l					2.15 J/	
Chlorobenzene	ug/l			0.73	1.82 J/	2.54 J/	
thylbenzene	ug/l					4.07 J/	
lo Compounds Detected	ug/l						
rans-1,2-Dichloroethen	e ug/l				3.75	3.81 J/	
is-1,2-Dichloroethene	ug/l	2.22	15.90	12.80	53.20 J/	10.30 J/	
,4-Dichlorobenzene	ug/l			7.24	3.98 1/		
and p-Xylene	ug/l					2.35 J/	
o-Xylene	ug/l				1.68 J/	3.03 J/	
1,2-Dichlorobenzene	ug/l			0.49	0.23 1/	0.66 J/	

SAMPLE Sample		PP-G113-01 4/06/88	PP-G113A-01 4/06/88	PP-G114-01 4/06/88	PP-G115-01 4/05/88	PP-G116-01 4/04/88	PP-G116A-01 4/04/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/i	3.50 J/	0.00 NR/	8.60 J/	16.00		
Chloroethane	ug/l	3.10 J/	0.00 NR/	11.00 J/	19.00		1.36
Methylene Chloride	ug/l	20.00 J/			19.10		
1,1-Dichloroethene	ug/l		0.53 J/				
1,1-Dichloroethane	ug/l	0.93 4/	43.80 J/	8.33 J/	2.75		1.90
Chloroform	ug/l						
1,2-Dichloroethane	ug/l		1.85 J/	1.37 J/			
1,1,1-Trichloroethane	ug/l		3.16 J/				3.71
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/i						
1,2-Dichloropropane	ug/l	1.47 J/	8.41 J/	7.90 J/	0.51		
Trichloroethene	ug/l	2.30 J/	80.30 J/	1.06 J/			2.50
Dibromochloromethane	ug/l		0.41 J/	0.44 J/			
1,1,2-Trichloroethane			•	·			
Benzene	ug/l	1.88 J/	4.69 J/	3.70 J/	2.80 J/		
trans-1,3-Dichloropro			1.49 J/				
Bromoform	ug/l		-				
Tetrachloroethene	ug/l	4.80 J/	36.10 J/-				
1,1,2,2-Tetrachloroet	-						4.52
Toluene	ug/l			1.78 J/			
Chlorobenzene	ug/l		2.23 J/	6.10 J/			
Ethylbenzene	ug/l			2.09 J/	2.13 J/		
No Compounds Detected	•			<b></b>	<b>~-</b>	0.00	
trans-1,2-Dichloroeth		0.97 J/	4.99 J/	2.42 J/			
cis-1,2-Dichloroethen		22.80 J/	188.00 J/	2.67 J/	5.36		9.84
1,4-Dichlorobenzene	ug/l	1.09 J/	5.87 J/	44.50 J/	4.50 J/		- 10 4
m and p-Xylene	ug/l		2.0. 0,	1.51 J/	V120 0,		
o-Xylene	ug/l	1.71 J/	1.95 J/	2.31 J/			
1,2-Dichlorobenzene	ug/l	· · · · •/	,,,,,	4.72 J/			

SAMPLE ID: SAMPLE DAT	E:	PP-G116A-91 _4/04/88	PP-G117-01 4/04/88	PP-G118A-01 4/05/88	PP-G119-01 4/04/88	PP-G119A-01 4/04/88	PP-MW105-01 4/07/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						14.90 R/
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l			-			
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l	4.28				0.36	1.29 J/
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						_
Trichloroethene	ug/l	2.73				0.65	0.37 J/
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
Tetrachloroethene	ug/l						
1,1,2,2-Tetrachloroethane		4.95					
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l		0.00		0.00		
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l	11.50		0.20 J/		1.60	0.72 J/
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xyl <i>e</i> ne	ug/l						
1,2-Dichlorobenzene	ug/l						

	SAMPLE ID: SAMPLE DATE:	PP-MW106-01 _4/04/88	PP-P1-01 4/04/88	PP-P3R-01 4/05/88	PP-P4R-01 4/05/88	PP-P4R-91 4/05/88	PP-P6-01 4/06/88
COMPOUNDS	UNIT						
Chloromethane	ug/i			4.00	4.00	4.00	
Vinyl Chloride	ug/l	5.20	6.00	4.00	2.00	2.00	
Chloroethane	ug/l	6.80	6.00				
Methylene Chlor	ide ug/l			18.80		15.00	
1,1-Dichloroeth	ene ug/l	•			0.33	0.22	2.10
1,1-Dichloroeth	ane ug/l	2.40	6.90	10.70	6.80	7.00	4.80
Chloroform	ug/l	•					
1,2-Dichloroeth	ane ug/l		0.53	0.38	0.43	0.39	0.39
1,1,1-Trichlore	ethane ug/l	0.65			7.90	7.70	12.60
Carbon Tetrachl	oride ug/l						0.23
Bromodichlorome	thane ug/l						
1,2-Dichloropro	pane ug/l	2.10	3.10	1.19	0.78	0.72	
Trichloroethene	ug/l	5.20	0.44	2.55	7.90	7.90	14.90
Dibromochlorome	thane ug/l						
1,1,2-Trichloro	ethane ug/l						
Benzene	ug/l	2.60 J/	2.08 J/	1.46 J/	1.40 J/	1.40 J/	
trans-1,3-Dichl	oropropene ug/l						
Bromoform	ug/l		0.49				
Tetrachloroethe	ne ug/l				8.70	8.10	10.00
1,1,2,2-Tetrach	loroethane ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l		1.30 J/				
Ethylbenzene	ug/l						
No Compounds De	tected ug/l						
trans-1,2-Dichl	oroethene ug/l						
cis-1,2-Dichlor		8.50	5.60	9.69	35.00	39.00	62.20
1,4-Dichlorober		7.30 J/	5.20 J/		1.00 3/	0.97 J/	
m and p-Xylene	ug/l	1.20 J/					
o-Xylene	ug/l						
1,2-Dichloroben	zene ug/l	0.48 J/	1.00 J/				

SAMPLE ID: Sample date	:	PP-P7-01 4/05/88	PP-PW1-01 4/08/88	PP-PW1-91 4/08/88
COMPOUNDS	UNIT			
Chloromethane	ug/l			
Vinyl Chloride	ug/l			
Chloroethane	ug/l	1.40		
Methylene Chloride	ug/l			
1,1-Dichloroethene	ug/l			
1,1-Dichloroethane	ug/l			•
Chloroform	ug/l			
1,2-Dichloroethane	ug/l			
1,1,1-Trichloroethane	ug/l	1.64		
Carbon Tetrachloride	ug/l			
Bromodichloromethane	ug/l		<del>-</del>	0.21 J/
1,2-Dichloropropane	ug/l			
Trichloroethene	ug/l			
Dibromochloromethane	ug/l			
1,1,2-Trichloroethane	ug/l			
Benzene	ug/l			
trans-1,3-Dichloropropene	ug/l			
Bromoform	ug/l			
T <b>e</b> trachloroethene	ug/l			
1,1,2,2-Tetrachloroethane	ug/l			
Toluene	ug/l			
Chlorobenz <i>e</i> ne	ug/l			
Ethylbenzene	ug/l			
No Compounds Detected	ug/l		0.00	
trans-1,2-Dichloroethene	ug/l			
cis-1,2-Dichloroethene	ug/l	0.58		
1,4-Dichlorobenzene	ug/l			
m and p-Xylene	ug/l			
o-Xylene	ug/l			
1,2-Dichlorobenzene	ug/l			

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

SAMPLE ID SAMPLE DA	-	PP-B15-01 4/08/88	PP-815P-01 4/05/88	PP-815R-01 4/05/88	PP-G109-01 4/06/88	PP-G109A-01 4/06/88	PP-G115-01 4/05/88
COMPOUNDS	UNIT						
1,4-Dichlorobenzene 1,2-Dichlorobenzene Acenaphthene Dibenzofuran bis(2-Ethylhexyl)phthala No Compounds Detected	ug/l ug/l ug/l ug/l te ug/l ug/l	r/ 03.0 6/ 03.0 7/ 03.0 11.00	0.00	6.00 /J	9.00 /J	3.00 /J	4.00 /J

	SAMPLE 10: SAMPLE DATE:	PP-G116-01 _4/04/88	PP-G116A-01 4/04/88	PP-G116A-91 4/04/88	PP-G117-01 4/04/88	PP-G118A-01 4/05/88	PP-MU106-01 4/04/88
COMPOUNDS	UNIT						
1,4-Dichlorol 1,2-Dichlorol Acenaphthene	penzene ug/l						12.00
Dibenzofuran	ug/l exyl)phthalate ug/l	0.00	0.00	0.00	0.00	0.00	7.00 /J

SAMPLE ID: SAMPLE DATE	:	PP-P1-01 4/04/88	PP-P3R-01 4/05/88	PP-P4R-01 4/05/88	PP-P4R-91 4/05/88
COMPOUNDS	UNIT				
1,4-Dichlorobenzene 1,2-Dichlorobenzene Acenaphthene	ug/l ug/l ug/l	5.00 /J			
Dibenzofuran bis(2-Ethylhexyl)phthalate No Compounds Detected	ug/l ug/l ug/l	5.00 /J	0.00	0.00	0.00

	SAMPLE ID: SAMPLE DATE:	PP-815-01 4/08/88	PP-B15P-01 4/05/88	PP-B15R-01 4/05/88	PP-G109-01 4/06/88	PP-G109A-01 4/06/88	PP-G115-01 4/05/88
COMPOUNDS	UNIT						
No Compounds	Detected ug/l	0.00	0.00	0.00	0.00	0.00	0.00

SAMPLE Sample		PP-G116-01 4/04/88	PP-G116A-01 4/04/88	PP-G116A-91 4/04/88	PP-G117-01 4/04/88	PP-G118A-01 4/05/88	PP-MW106-01 4/04/88
COMPOUNDS	UNIT					,	
No Compounds Detected	ug/l	0.00	0.00	0.00	0.00	0.00	0.00

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA ANALYSIS TYPE: Pesticides/PCBs MATRIX: Ground Water

SAMPLE ID: PP-P1-01 PP-P3R-01 PP-P4R-01 PP-P4R-91 4/04/88 4/05/88 4/05/88 4/05/88 SAMPLE DATE: COMPOUNDS UNIT No Compounds Detected ug/l 0.00 0.00 0.00 0.00

	SAMPLE ID: SAMPLE DATE:	PP-804-01 4/05/88	PP-8060-01 4/07/88	PP-806S-01 4/07/88	PP-B07-01 4/07/88	PP-809-01 4/05/88	PP-B10-01 4/06/88
COMPOUNDS	<u>UNIT</u>						
Arsenic Barium Cadmium Calcium Cobelt Copper Iron Lead Magnesium Manganese Nickel Potassium Silver Sodium Thallium Vanadium Zinc Cyanide, Tota	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	10.00 1570.00 0.70	17.00 0.90	29.00 0.70	58.00 0.50	24.00 1.00	30.00 0.30

	SAMPLE ID: SAMPLE DATE:	PP-811-01 4/07/88	PP-B11A-01 4/07/88	PP-B11A-91 4/07/88	PP-812-01 4/06/88	PP-B13-01 4/06/88	PP-B14-01 4/05/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium Calcium Cobalt Copper Iron Lead Magnesium Manganese Nickel Potassium Silver Sodium Thallium Vanadium Zinc Cyanide, Tota	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	29.00 1.30	47.00 2.00	37.00 1.60	156.00	102.00	30.00 0.30

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-815-01 4/08/88	PP-815P-01 4/05/88	PP-B15R-01 4/05/88	PP-B16-01 4/06/88	PP-B16A-01 4/07/88	PP-G107-01 4/06/88
COMPOUNDS	UNIT						
Arsenic	ug/l	46.00 /N		3.00 /BN			
Barium	ug/l	362.00		835.00	51.00	21.00	30.00 /N
Cadmium	ug/l			8.00 /*	1.00	1.20	0.20
Calcium	ug/l	46200.00	72400.00	122000.00			
Cobalt	ug/l						
Copper	ug/l			-			
Iron	ug/l	3530.00		497.00 /*			
Lead	ug/l						
Magnes i um	ug/l	66100.00	41000.00	96600.00			
Manganese	ug/l	41.00	59.00 /*	1230.00 /*			
Nickel	ug/l	224.00		186.00			
Potassium	ug/l	141000.00		78800.00			
Silver	ug/l						
Sodium	ug/l	280000.00	6700.00	194000.00			
Thallium	ug/l	3.00 /B	3.00 /B	5.00 J/B+			
Vanadium	ug/l						
Zinc	ug/l	967.00	1450.00	1970.00			
Cyanide, Tota	il ug/l	6.00		165.00			

	SAMPLE ID: SAMPLE DATE:	PP-G108-01 4/06/88	PP-G109-01 4/06/88	PP-G109A-01 4/06/88	PP-G110-01 4/06/88	PP-G112-01 4/06/88	PP-G113-01 4/06/88
COMPOUNDS	UNIT						
Arsenic	ug/l			2.00 /BN	11.00		
Barium	ug/l	30.00	172.00 /B	265.00	560.00	104.00	114.00
Cadmium	ug/l	0.50	16.00 /*			0.70	0.70
Calcium	ug/l		225000.00	193000.00			
Cobalt	ug/l						
Copper	ug/l						
Iron	ug/l		191.00 /*	109.00 /*			
Lead	ug/l		7.00				
Magnes i um	ug/l		72900.00	107000.00			
Manganese	ug/l		191.00 /*	188.00 /*			
Nickel	ug/l			87.00			
Potassium	ug/l						
Silver	ug/l			2.00			
Sodium	ug/l		14300.00	27300.00			
Thallium	ug/l		2.00 J/B+	3.00 /B			
Vanadi um	ug/l		50.00				
Zinc	ug/l		5340.00	6340.00			
Cyanide, Tota	l ug∕i		15.00	8.00			

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: Metels MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G113A-01 4/06/88	PP-G114-01 4/06/88	PP-G115-01 4/05/88	PP-G116-01 4/05/88	PP-G116A-01 4/05/88	PP-G116A-91 4/05/88
COMPOUNDS	UNIT						
Arsenic	ug/l			19.00 /N			
Barium Cadmium	ug/l ug/l	120.00 0.60	742.00	298.00		170.00 /B	160.00 /B
Calcium Cobalt	ug/l ug/l			194000.00	75900.00	81900.00	80800.00
Copper	ug/l				122.00 /N		
Iron Lead	ug/l ug/l			11000.00 /*		6.00	
Magnesium Manganese	ug/l ug/l			90700.00 2010.00 /*	25800.00	44000.00	43100.00
Nickel Potassium	ug/l ug/t			162.00	79.00		44.00
Silver	ug/l						
Sodium Thallium	ug/l ug/l			2.00 /B	2.00 /8	11400.00 3.00 J/B+	11100.00 2.00 J/B+
Vanadium Zinc	ug/l ug/i			60.00	•	3000 0,0	2.00 2/8.
Cyanide, Total				211.00 158.00	37.00 494.00		6.00

	SAMPLE ID: SAMPLE DATE:	PP-G117-01 _4/05/88	PP-G118A-01 4/05/88	PP-G119-01 4/04/88	PP-G119A-01 4/04/88	PP-MW105-01 4/07/88	PP-MW106-01 4/05/88
COMPOUNDS	UNIT						
Arsenic Barium	ug/l ug/l			19.00	28.00	26.00	1030.00
Cadmium	ug/l			17.00	0.60	20.00	1030.00
Calcium	ug/l	75500.00	73100.00		****		84900.00
Cobalt	ug/l						
Copper	ug/l			•			
Iron	ug/l	•					375.00 /*
Lead	ug/l	/4400 00	79500 00				7/100 00
Magnes i um	ug/l	41100.00	38500.00				74100.00
Manganese	ug/l	65.00	44.00				981.00 /* 213.00
Nickel	ug/l		46.00				83700.00
Potassium Silver	ug/l ug/l						83700.00
Sodium	ug/l	8400.00	21600.00				182000.00
Thatlium	ug/l	3.00 /B	3.00 /B				6.00 /B
Vanadium	ug/l	3.00 /5	3,55 75				0,00 ,2
Zinc	ug/l	657.00	48.00				4720.00
Cyanide, Tota		14.00					193.00

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA
ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-P1-01 4/05/88	PP-P3R-01 4/05/88	PP-P4R-01 4/05/88	PP-P4R-91 4/05/88	PP-P6-01 4/06/88	PP-P7-01 4/05/88
COMPOUNDS	<u>unit</u>						
Arsenic	ug/l	10.00 /N	4.00 /BN				
Barium Cadmium	ug/l ug/l		434.00 9.00 /*	440.00	464.00	48.00	33.00
Calcium Cobalt	ug/l	113000.00	125000.00	120000.00	126000.00		0.80
Copper	ug/l ug/l	84.00		•	63.00		
Iron Lead	ug/l ug/l	6230.00 /*	3830.00 /*	72.00	253.00 /*		
Magnes i um	ug/t	73300.00	49500.00	32.00 58700.00	37.00 61300.00		
Manganese Nickel	ug/l ug/l	219.00 /*	780.00 /*	1160.00 /* 48.00	1230.00 /*		
Potassium Silver	ug/l ug/l	38000.00 3.00	9000.00	10000.00	10500.00		
Sodium	ug/l	93600.00	3.00 /8 39200.00	65100.00	62200.00		
Thallium Vanadium	ug/l ug/l	3.00 J/B+	4.00 /B	5.00 /B	4.00 /B		
Zinc Cyanide, Tota	ug/l	101.00	587.00	5660.00	5490.00		
cyaniae, luca	l ug/l	101.00	28.00	62.00	52.00		

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 GROUNDWATER DATA

ANALYSIS TYPF: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-PW1-01 _4/08/88	PP-PW1-91 4/08/88
COMPOUNDS	UNIT		
Arsenic	ug/l		
Barium	ug/l	49.00	38.00
Cadmium	ug/l		
Calcium	ug/l		
Cobalt	ug/l		
Copper	ug/l		
Iron	ug/l		
Lead	ug/l		
Magnes i um	ug/l		
Manganese	ug/l		
Nickel	ug/l		
Potassium	ug/l		
Silver	ug/l		
Sodium	ug/l		
Thallium	ug/l		
Vanadium	ug/l		
Zinc	ug/l		
Cyanide, Total	ug/t		

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

### APPENDIX C ROUND 1 GROUNDWATER SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Ground Water

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
PP-B15-01	TBNA TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Hexadecanoic Acid Benzoic Acid, 4-(1,1-Dimethylethyl)- Sulfur, Mol. (S8) Camphor (ACN) Benzamide, n,n-diethyl-3-methyl- 2(3H)-Benzothiazolone Benzenesulfonamide, n-ethyl-4-methyl- Phenol, 2,3-dimethyl- Phenol, 4-(1-methylethyl)-	6.100 5.900 6.900 13.000 9.900 18.000 14.000 9.200 6.400 8.600 10.000 17.000 8.200 14.000 10.000 11.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l		טטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטט
PP-B15R-01	TBNA TBNA TBNA TBNA TBNA	Unknown Benzoic Acid, 4-(1,1-Dimethylethyl)- Sulfur, Mol. (S8) 2(3H)-Benzothiazolone Benzamide, n-(1,1-dimethylethyl)-4 methyl-	14.000 11.000 48.000 15.000 20.000			J J J
PP-G109A-01	TBNA	Sulfur, Mol. (S8)	21.000	ug/1		J
PP-MW106-01	TBNA TBNA	Unknown Unknown	16.000 14.000	ug/l ug/l		J J

## APPENDIX C ROUND 1 GROUNDWATER SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

25-Oct-1989 Page 2

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Ground Water

SAMPLE ID			CONC.	UNITS	DVQ	LQ
	TBNA TBNA	Sulfur, Mol. (S8) 2(3H)-Benzothiazolone	52.000 15.000	ug/l ug/l		J
PP-P4R-01	TBNA	Unknown	12.000	ug/l		J
PP-P4R-91	TBNA	Unknown	13.000	ug/l		J

# ROUND 2 GROUNDWATER RESULTS

### RESULTS OF pH AND SPECIFIC CONDUCTANCE MEASUREMENTS FOR ROUND 2 SAMPLES

Sample	На	Sp Cond umho/cm	<u>S</u> :	ample	рН	Sp Cond umho/cm
<u>Leachate</u>		·				
LLA3	7.66	34200	G	112	7.18	1430
LLB1	6.90	33600		1113	6.62	1620
LLG3	7.75	25700		3113A	6.84	1480
LLG7	7.67	30500		114	6.51	1540
LLMHWEST	7.79	28900		1115	6.60	1410
LLMHEAST	7.73	24500		116	7.43	625
			G	116A	7.27	1030
Groundwater			G	5117	7.42	770
Bio	7.16	815	G	3118R	7.09	730
B11	7.18	760	G	3118A	7.43	617
B11A	,7.02	840	G	3119	7.25	590
B9	7.39	600	G	119A	7.30	635
B12	6.57	1510	M	1W 105	7.47	650
B13	6.60	1400	M	1W 106	7.00	2980
B14	7.48	660	P	71	6.99	1610
B15	6.87	5620	P	23R	6.79	1090
B15P	7.39	630	P	24R	7.12	1360
B15R	6.84	3300	P	P6	7.51	665
B16	7.39	700	P	P7	7.18	865
B16A	7.44	570				
B <b>4</b>	7.05	1040	P	<u>Private Well</u>		
B6D	7.40	550	P	PW1	7.51	630
B6S	7.60	660				
B7	7.15	680				
G107	7.12	620				
G108	6.72	1080				
G109A	6.76	1520				
G110	7.05	1820				
G111	7.41	670				
G109	6.78	1390				

160R08JAH

	SAMPLE ID:	PP-B04-02	PP-8060-02	PP-B060-92	PP-806S-02	PP-807-02	PP-B09-02
	SAMPLE DATE:	6/15/88	6/15/88	6/15/88	6/15/88	6/15/88	6/15/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	565.00	277.00	268.00	270.00	302.00	292.00
Chloride	mg/l	9.00	11.00	10.00	27.00	26.00	6.00
Phenol	ug/l	9.00 J/	14.00 J/	11.00 J/	16.00 J/	8.00 J/	14.00 J/

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA
ANALYSIS TYPF: GW Indicators MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-810-02 6/14/88	PP-B11-02 6/14/88	PP-B11A-02 6/14/88	PP-B12-02 6/14/88	PP-B13-02 6/14/88	PP-B14-02 6/14/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/t mg/t ug/t	424.00 17.00 22.00 J/	392.00 6.00 5.00 J/	476.00 11.00 9.00 J/	953.00 25.00 5.00 J/	781.00 32.00	279.00 12.00 9.00 J/

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### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE ID:	PP-B15-02	PP-B15P-02	PP-B15R-02	PP-816-02	PP-816A-02	PP-G107-02
	SAMPLE DATE:	6/20/88	6/20/88	6/20/88	6/14/88	6/14/88	6/14/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	1640.00	283.00	1180.00	313.00	238.00	295.00
Chloride	mg/l	860.00	15.00	348.00	17.00	18.00	16.00
Phenol	ug/l	145.00	11.00 J/	14.00 J/	10.00 J/	12.00 J/	7.00 J/

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	SAMPLE ID: SAMPLE DATE:	PP-G108-02 6/14/88	PP-G108-92 6/14/88	PP-G109-02 6/14/88	PP-G109A-02 6/14/88	PP-G110-02 6/14/88	PP-G111-02 6/15/88
COMPOUNDS	<u>UNIT</u>						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	608.00 11.00 11.00 J/	611.00 11.00 8.00 J/	829.00 27.00	870.00 60.00 5.00 J/	680.00 234.00 170.00	268.00 22.00 8.00 J/

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA
ANALYSIS TYPE: GW Indicators Matrix: Ground Water

	SAMPLE ID:	PP-G112-02	PP-G113-02	PP-G113A-02	PP-G114-02	PP-G115-02	PP-G116-02
	SAMPLE DATE:	6/14/88	6/14/88	6/14/88	6/14/88	6/14/88	6/20/88
COMPOUNDS	<u>UNIT</u>						
Alkalinity	mg/l	615.00	840.00	842.00	847.00	816.00	292.00
Chloride	mg/l	34.00	29.00	28.00	44.00	48.00	7.00
Phenol	ug/i	9.00 J/	17.00 J/	12.00 J/	19.00 J/	8.00 J/	14.00 J/

	SAMPLE ID:	PP-G116A-02	PP-G116A-92	PP-G117-02	PP-G118A-02	PP-G118R-02	PP-G119-02
	SAMPLE DATE:	6/20/88	6/20/88	6/20/88	6/20/88	6/20/88	6/20/88
COMPOUNDS	<u>unit</u>						
Alkalinity	mg/l	399.00	395.00	387.00	272.00	338.00	295.00
Chloride	mg/l	99.00	101.00	26.00	14.00	33.00	8.00
Phenol	ug/l	13.00 J/	9.00 J/	7.00 J/	13.00 J/	8.00 J/	11.00 J/

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE ID:	PP-G119A-02	PP-MW105-02	PP-MW105-92	PP-MW106-02	PP-P1-02	PP-P3R-02
	SAMPLE DATE:	6/20/88	6/15/88	6/15/88	6/20/88	6/20/88	6/20/88
COMPOUNDS	<u>UNIT</u>						
Alkalinity	mg/l	270.00	258.00	257.00	949.00	626.00	479.00
Chloride	mg/l	13.00	19.00	19.00	378.00	176.00	46.00
Phenol	ug/l	8.00 J/	11.00 J/	18.00 J/	12.00 J/	11.00 J/	8.00 J/

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	SAMPLE ID: SAMPLE DATE:	PP-P4R-02 6/20/88	PP-P6-02 6/14/88	PP-P6-92 6/14/88	PP-P7-02 6/20/88	PP-PHO-02 6/15/88
COMPOUNDS	UNIT					
Alkalinity Chloride Phenol	mg/l mg/l ug/l	622.00 188.00 14.00 J/	277.00 18.00	274.00 18.00	410.00 40.00 8.00 J/	272.00 13.00 13.00 J/

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

SAMPLE ID: Sample dat	E:	PP-B04-02 6/15/88	PP-B06D-02 6/15/88	PP-806D-92 6/15/88	PP-B06S-02 6/15/88	PP-B07-02 6/15/88	PP-B09-02 6/15/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l	1.80 J/					
Chloroethane	ug/l	4.30 J/					
1,1-Dichloroethene	ug/l	6.00 J/	0.56	0.54			
1,1-Dichloroethane	ug/l	170.00	8.20	8.10			
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	13.00 J/	2.00	2.00			
1,1,1-Trichloroethane	ug/l	350.00	1.20	0.94	0.78		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	8.90 J/		0.22			
Trichloroethene	ug/l	350.00	0.58	0.37			
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l	4.00 J/					
Benzene	ug/l	1.90 J/					
trans-1,3-Dichloropropene	ug/l						
Tetrachloroethene	ug/l	810.00			0.51		
Toluene	ug/l	1.70 J/					
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l					0.00	0.00
trans-1,2-Dichloroethene	ug/l	0.68 J/					
cis-1,2-Dichloroethene	ug/l	750.00	88.00	86.00			
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l	3.90 J/					
o-Xylene	ug/l	9.20 J/					
1,2-Dichlorobenzene	ug/l	•					
1,3-Dichlorobenzene	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNWATER DATA
ANALYSIS TYPF: Volatiles MATRIX: Ground Water

SAMPLE ID: SAMPLE DATE	•	PP-B10-02 6/14/88	PP-B11-02 6/14/88	PP-B11A-02 6/14/88	PP-812-02 6/14/88	PP-813-02 6/14/88	PP-814-02 6/14/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l				8.70	12.00 J/	
Chloroethane	ug/l	0.29		1.50 J/	7.00	14.00 J/	
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	1.30		2.00 1/	13.00	21.00 J/	
Chloroform	ug/l					11.00 J/	
1,2-Dichloroethane	ug/l			•	1.80	3.50 J/	
1,1,1-Trichloroethane	ug/l	4.00		0.70 J/		3.80 J/	
Carbon Tetrachloride	ug/l					0.42 J/	
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	1.00			11.00	10.00 J/	
Trichloroethene	ug/l	4.60		2.60 J/	7.60	41.00 J/	
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l				0.67	2.50	
trans-1,3-Dichloropropend	: ug/l						
Tetrachloroethene	ug/l	3.10	0.76	5.60 J/	6.60	22.00 J/	
Toluene	ug/l						
Ch l orobenzene	ug/l				4.80	1.30 J/	
Ethylbenzene	ug/l				3.30	2.10	
No Compounds Detected	ug/l						0.00
trans-1,2-Dichloroethene	ug/l				2.90	3.10 J/	
cis-1,2-Dichloroethene	ug/l	20.00		8.20 J/	90.00	190.00 J/	
1,4-Dichlorobenzene	ug/l	0.33			22.00	11.00 J/	
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l				3.20	0.47 J/	
1,3-Dichlorobenzene	ug/l						

SAMPLE 1D: SAMPLE DAT		PP-B15-02 6/20/88	PP-B15P-02 6/20/88	PP-B15R-02 6/20/88	PP-B16-02 6/14/88	PP-B16A-02 6/14/88	PP-G107-02 6/14/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l	3.00 1/		3.20			
Chloroethane	ug/l	1.50 J/		7.50			
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l		0.80	8.90	0.67	0.96	0.29
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	0.24 J/		1.10			
1,1,1-Trichloroethane	ug/l		2.50	0.29	4.70	4.20	1.30
Carbon Tetrachloride	ug/l		0.20				
Bromodichloromethane	ug/l	0.24 J/					
1,2-Dichloropropane	ug/l	0.86 1/		5.70			
Trichloroethene	ug/l		4.10	4.60	3.10	2.10	1.00
Dibromochloromethane	ug/l	0.24 J/					
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l	5.20		2.80			
trans-1,3-Dichloropropene							
Tetrachloroethene	ug/L		1.90	1.60	2.60	1.90	0.45
Toluene	ug/l	0.24					
Chlorobenzene	ug/l	0.59 1/		0.94			
Ethylbenzene	ug/l	2.30					
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l			0.83			
cis-1,2-Dichloroethene	ug/l		9.20	9.60	16.00	34.00	8.70
1,4-Dichlorobenzene	ug/l	16.00 J/					
m and p-Xylene	ug/l	1.00					
o-Xyl ene	ug/l	1.80					
1,2-Dichlorobenzene	ug/l	2.70 J/					
1,3-Dichlorobenzene	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE Sample		PP-G108-02 6/14/88	PP-G108-92 6/14/88	PP-G109-02 6/14/88	PP-G109A-02 6/14/88	PP-G110-02 6/14/88	PP-G111-02 6/15/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l	0.20		3.70	9.50	98.00	
Chloroethane	ug/l	1.00	0.85	4.70	11.00	150.00	
1,1-Dichloroethene	ug/l				0.21	0.41	
1,1-Dichloroethane	ug/t	0.48	1.20	4.20	18.00	68.00	6.80
Chloroform	ug/l						
1,2-Dichloroethane	ug/l					4.10	
1,1,1-Trichloroethane		0.40	0.81			0.21	8.70
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichtoropropane	ug/l	1.10	0.84	3.00	5.90	9.60	
Trichloroethene	ug/l	3.70	4.30	1.10	30.00	9.60	6.60
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l				3.30	17.00	
trans-1,3-Dichloroprop	pene ug/l						
Tetrachloroethene	ug/l	5.20	5.90 J/	3.40	7.60	2.50	9.50
Toluene	ug/l					3.00	
Chlorobenzene	ug/l			0.52		2.50	
Ethylbenzene	ug/l			0.24	1.20	1.30	
No Compounds Detected	ug/i						
trans-1,2-Dichloroethe				1.00	4.00	6.50	
cis-1,2-Dichloroethene		6.90	7.80	9.40	64.00	10.00	41.00
1,4-Dichlorobenzene	ug/l	0.57	0.63	7.00	4.20	9.90	
m and p-Xylene	ug/l					4.40	
o-Xylene	ug/l					6.10	
1,2-Dichlorobenzene	ug/l			0.48	0.30	1.40	
1,3-Dichlorobenzene	ug/l					0.44	

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Vater

SAMPLE ID: SAMPLE DAT		PP-G112-02 6/14/88	PP-G113-02 6/14/88	PP-G113A-02 6/14/88	PP-G114-02 6/14/88	PP-G115-02 6/14/88	PP-G116-02 6/20/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l		2.40 J/	13.00	5.80	16.00	
Chloroethane	ug/l		1.80 J/	92.00	9.00	30.00	
1,1-Dichloroethene	ug/l			1.40		0.39	
1,1-Dichloroethane	ug/l		2.50 J/	110.00	12.00	2.60	
Chloroform	ug/l						
1,2-Dichloroethane	ug/l			1.90	1.80		
1,1,1-Trichloroethane	ug/l			2.20			
Carbon Tetrachloride	ug/l				0.33	8.00	
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l		0.77 J/	7.80	11.00	0.67	
Trichloroethene	ug/l		1.10 J/	160.00	0.85		
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l		0.96	4.50	3.50	0.51	
trans-1,3-Dichloropropene				2.80	0.63		
Tetrachloroethene	ug/l	1.00	5.30 J/	75.00			
Toluene	ug/l				0.37		
Chlorobenzene	ug/l			1.20	8.30		
Ethylbenzene	ug/l		0.38	1.00		0.28	
No Compounds Detected	ug/l						0.00
trans-1,2-Dichloroethene	ug/l		0.23 J/	4.60	3.40		
cis-1,2-Dichloroethene	ug/l		15.00 J/	280.00	1.50	6.60	
1,4-Dichlorobenzene	ug/l		1.40 J/	5.50	63.00	3.10	
m and p-Xylene	ug/l		· ·		2.40		
o-Xyl ene	ug/l		0.45		0.71		
1,2-Dichlorobenzene	ug/l			0.36	7.40		
1,3-Dichlorobenzene	ug/l						

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SAMPLE ID: SAMPLE DAT		PP-G116A-02 6/20/88	PP-G116A-92 6/20/88	PP-G117-02 6/20/88	PP-G118A-02 6/20/88	PP-G118R-02 6/20/88	PP-G119-02 6/20/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l						
Chloroethane	ug/l	0.53	0.53				
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	3.50	3.60				
Chloroform	ug/l						
1,2-Dichloroethane	ug/l			•			
1,1,1-Trichloroethane	ug/l	4.90	4.80				
Carbon Tetrachloride	ug/l			2.10 J/			
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l	4.10	4.20				
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene							
Tetrachloroethene	ug/l	5.40	5.50				
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l				0.00	0.00	0.00
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l	18.00	18.00				
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE ID SAMPLE DA	-	PP-G119A-02 6/20/88	PP-MN105-02 6/15/88	PP-MH105-92 6/15/88	PP-NW106-02 6/20/88	PP-P1-02 6/20/88	PP-P3R-02 6/20/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l				3.10 J/	4.40 1/	1.90
Chloroethane	ug/l				5.40 J/	5.40 J/	1.90
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l				6.00 J/	7.10 J/	10.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l			•	0.48 J/	0.52 J/	0.38
1,1,1-Trichloroethane	ug/l	0.37	1.50	1.40	3.10 J/		0.47
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l				3.00 J/	2.50 J/	1.10
Trichloroethene	ug/l	0.47			6.70 J/	3.60 J/	1.60
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l				2.30	0.93	0.68
trans-1,3-Dichloropropen	e ug/l						
Tetrachloroethene	ug/l				0.76 J/		
Toluene	ug/l						
Chlorobenzene	ug/l				0.60 J/		
Ethylbenzene	ug/l				0.79		0.75
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l				0.63 J/	0.56 J/	0.34
cis-1,2-Dichloroethene	ug/l	1.10	0.37	0.34	10.00 J/	13.00 J/	8.30
1,4-Dichlorobenzene	ug/l				7.10 J/	0.93 1/	1.40
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l				0.55 J/		
1,3-Dichlorobenzene	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNWATER DATA
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE ID: SAMPLE DAT		PP-P4R-02 6/20/88	PP-P6-02 6/14/88	PP-P6-92 6/14/88	PP-P7-02 6/20/88	PP-PWO-02 6/15/88
COMPOUNDS	TINU					
Vinyl Chloride	ug/l	0.95				
Chloroethane	ug/l	2.70				
1,1-Dichloroethene	ug/l		3.50	3.10		
1,1-Dichloroethane	ug/l	6.70	10.00	10.00		
Chioroform	ug/l					
1,2-Dichloroethane	ug/l	0.45	1.50	1.50		
1,1,1-Trichloroethane	ug/l	6.80	33.00	37.00	1.30 J/	
Carbon Tetrachloride	ug/l		1.00	1.20		
Bromodichloromethane	ug/l					
1,2-Dichloropropane	ug/l	0.47				
Trichloroethene	ug/l	7.40	36.00	36.00		
Dibromochloromethane	ug/l					
1,1,2-Trichloroethane	ug/l					
Benzene	ug/l	0.83				
trans-1,3-Dichloropropene						
Tetrachloroethene	ug/l	7.40	31.00	31.00	0.27 J/	
Toluene	ug/l				-	
Chlorobenzene	ug/l	0.34				
Ethylbenzene	ug/l	0.44				
No Compounds Detected	ug/l					0.00
trans-1,2-Dichloroethene	ug/l	0.32				
cis-1,2-Dichloroethene	ug/l	31.00	93.00 J/	78.00		
1,4-Dichlorobenzene	ug/l	1.40				
m and p-Xylene	ug/l					
o-Xylene	ug/l					
1,2-Dichlorobenzene	ug/l					
1,3-Dichlorobenzene	ug/l					

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

	SAMPLE ID: SAMPLE DATE:	PP-804-02 6/15/88	PP-8060-02 6/15/88	PP-8060-92 6/15/88	PP-B06S-02 6/15/88	PP-807-02 6/15/88	PP-809-02 6/15/88
COMPOUNDS	<u>UNIT</u>						
Arsenic Barium Cadmium	ug/l ug/l ug/l	11.00 1640.00 J/*+	34.00	39.00	45.00	54.00 0.20	49.00

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA
ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-B10-02 6/14/88	PP-B11-02 6/14/88	PP-B11A-02 6/14/88	PP-B12-02 6/14/88	PP-B13-02 6/14/88	PP-B14-02 6/14/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	41.00 0.50	34.00 0.30	43.00 1.40	227.00	263.00	51.00 0.30

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-B15-02 6/20/88	PP-B15P-02 6/20/88	PP-B15R-02 6/20/88	PP-B16-02 6/14/88	PP-B16A-02 6/14/88	PP-G107-02 6/14/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	33.00 693.00	52.00	1110.00	70.00	36.00 1.00	37.00 0.30

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G108-02 6/14/88	PP-G108-92 6/14/88	PP-G109-02 6/14/88	PP-G109A-02 6/14/88	PP-G110-02 6/14/88	PP-G111-02 6/15/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	79.00 J/	55.00 J/ 0.50	188.00	207.00	14.00 952.00 0.60 J/	218.00 0.40

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G112-02 6/14/88	PP-G113-02 6/14/88	PP-G113A-02 6/14/88	PP-G114-02 6/14/88	PP-G115-02 6/14/88	PP-G116-02 6/20/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	105.00 0.20	174.00 1.10	175.00 0.70	20.00 1145.00	40.00 366.00 J/*+	50.00

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### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA

ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G116A-02 6/20/88	PP-G116A-92 6/20/88	PP-G117-02 6/20/88	PP-G118A-02 6/20/88	PP-G118R-02 6/20/88	PP-G119-02 6/20/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	280.00	288.00	68.00	32.00	467.00 0.40	33.00

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: Metals MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-G119A-02 6/20/88	PP-MW105-02 6/15/88	PP-MW105-92 6/15/88	PP-MW106-02 6/20/88	PP-P1-02 6/20/88	PP-P3R-02 6/20/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	39.00	29.00	30.00	1050.00	8.00 1070.00	11.00 400.00 0.40

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### APPENDIX C

### WINNEBAGO RECLAMATION LANDFILL ROUND 2 GROUNDWATER DATA ANALYSIS TYPE: Metals MATRIX: Ground Water

SAMPLE ID: PP-P4R-02 PP-P6-02 PP-P6-92 PP-P7-02 PP-PWO-02 6/20/88 6/14/88 6/14/88 6/15/88 SAMPLE DATE: 6/20/88 COMPOUNDS UNIT Arsenic ug/l Barium ug/l 771.00 48.00 J/ 82.00 J/ 40.00 63.00 Cadmium ug/l 0.90 0.50

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

# ROUND 1 SURFACE WATER RESULTS

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 SURFACE WATER DATA
ANALYSIS TYPE: GW Indicators MATRIX: Surface Water

	SAMPLE ID: SAMPLE DATE:	PP-SW01-01 4/07/88	PP-SW02-01 4/08/88	PP-SW03-01 4/08/88	PP-SW03-91 4/08/88	PP-\$W04-01 4/08/88	PP-\$W05-01 4/08/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol	mg/l mg/l ug/l	186.00 25.00	214.00 27.00	210.00 26.00	212.00 26.00 9.00	212.00 26.00	217.00 26.00 7.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Gualifier/Laboratory Qualifier) to the right of the value.

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 SURFACE WATER DATA ANALYSIS TYPE: Volatiles MATRIX: Surface Water

	SAMPLE ID: SAMPLE DATE:	PP-SW01-01 _4/07/88	PP-SW02-01 4/08/88	PP-SW03-01 4/08/88	PP-\$W03-91 4/08/88	PP-SW04-01 4/08/88	PP-SW05-01 4/08/88
COMPOUNDS	UNIT						
Chloroethane Methylene Chlori	ug/l ide ug/l	19.10		2.25			
1,1,1-Trichloroe		17.10		0.70 1.06			
Benzene	ug/l			1.74			
No Compounds Det			0.00	0.67	0.00	0.00	0.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 SURFACE WATER DATA
ANALYSIS TYPE: Metals MATRIX: Surface Water

	SAMPLE ID: SAMPLE DATE:	PP-SW01-01 _4/07/88	PP-SW02-01 4/08/88	PP-SW03-01 4/08/88	PP-SW03-91 4/08/88	PP-SW04-01 4/08/88	PP-SW05-01 4/08/88
COMPOUNDS	UNIT						
Barium Cadmium	ug/l ug/l	70.00 0.80	80.00	73.00	80.00	76.00	76.00

# ROUND 1 SEDIMENT RESULTS

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 1 ANALYSIS TYPE: Volatiles MATRIX: Sediment

	LE ID: LE DATE:	PP-SD01-01 4/08/88	PP-SD02-01 4/08/88	PP-SD03-01 4/08/88	PP-SD03-91 4/08/88	PP-SD04-01 4/08/88	PP-SD05-01 4/08/88
COMPOUNDS	UNIT						
Chloroform Methylene Chloride Acetone Benzene Toluene	ug/kg ug/kg ug/kg ug/kg ug/kg		2.00 /3			2.00 /J	11.00 UJ/B 65.00 UJ/B 7.00 UJ/U 2.00 UJ/JB
No Compounds Detect	ed ug/kg	0.00		0.00	0.00		

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 SEDIMENT DATA ANALYSIS TYPE: Semi-Volatiles MATRIX: Sediment

SAMPLE ID: SAMPLE DATE:	PP-SD01-01 4/08/88	PP-SD02-01 4/08/88	PP-SD03-01 4/08/88	PP-\$D03-91 4/08/88	PP-SD04-01 4/08/88	PP-SD05-01 4/08/88
COMPOUNDS	<u>UNIT</u>					
fluoranthene Pyrene Benzo(a)anthracene	ug/kg ug/kg ug/kg ug/kg ug/kg	4400.00	3900.00			160.00 /J 160.00 /J 84.00 /J 95.00 /J
bis(2-Ethylhexyl)phthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene		<b>(1</b> )		0.00	0.00	95.00 /J 85.00 /J 95.00 /J

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C

#### WINNEBAGO RECLAMATION LANDFILL ROUND 1 SEDIMENT DATA MATRIX: Sediment

ANALYSIS TYPE: Pesticides/PCBs

SAMPL	E ID: E DATE:	PP-SD01-01 _4/08/88	PP-SD02-01 4/08/88	PP-\$003-01 4/08/88	PP-SD03-91 4/08/88	PP-SD04-01 4/08/88	PP-SD05-01 4/08/88
COMPOUNDS	UNIT						
No Compounds Detecte	ed ug/kg	0.00	0.00	0.00	0.00	0.00	0.00

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 SEDIMENT DATA ANALYSIS TYPE: Metals MATRIX: Sediment

	SAMPLE ID: SAMPLE DATE:	PP-\$001-01 4/08/88	PP-SD02-01 4/08/88	PP-\$003-01 4/08/88	PP-S003-91 4/08/88	PP-SD04-01 4/08/88	PP-SD05-01 4/08/88
COMPOUNDS	UNIT						
Aluminum	mg/kg	5980.00 R/	2310.00 R/	5130.00 R/	4570.00 R/	1350.00 R/	5820.00 R/
Arsenic	mg/kg		1.30 J/*N	2.00 J/*N	5.90 J/*N	0.70 J/B*N	2.20 J/*N
Barium	mg/kg	81.90	19.50 /B	53.90	54.70	15.20 /B	73.40
Cadmium	mg/kg		1.00 J/N	0.80 J/N		-	
Calcium	mg/kg	20400.00	27500.00	43000.00	54800.00	22500.00	26300.00
Chromium, Tota	l mg/kg	8.80 /*	2.60 /*	5.60 /*	7.30 /*	3.50 /*	5.80 /*
Copper	mg/kg	5.50 /*		7.60 /*	- •	•	6.90 /*
lron	mg/kg	9560.00 J/*	4800.00 J/*	9130.00 J/*	10800.00 J/*	2740.00 J/*	9550.00 J/*
Lead	mg/kg	4.80 J/+*N	6.70 J/ <b>*</b> N	4.30 J/*N	7.40 J/*N	1.60 J/*N	8.40 J/*N
Magnes i um	mg/kg	10100.00	16400.00	23700.00	•	13600.00	11600.00
Manganese	mg/kg	239.00 J/	211.00 J/	169.00 J/	185.00 J/	75.20 J/	282.00 J/
Nickel	mg/kg	9.10 J/*		9.80 J/*	9.60 J/*		
Potassium	mg/kg	631.00 R/	621.00 R/	1000.00 R/	1180.00 R/		
Silver	mg/kg		0.10 /B	0.10 /8	-	0.10 /B	0.10 /B
Thailium	mg/kg	0.20 B/B	0.20 8/8	0.20 B/B	0.60 B/B		0.20 B/B
Vanad <b>ium</b>	mg/kg	16.70	6.60	9.70	15.40		8.80
Zinc	mg/kg	26.90	13.60	20.30	27.20	8.90	34.50
Cyanide, Total	mg/kg	16.10	3.71	7.94 J/	17.50 J/	3.42	28.60

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

# APPENDIX C ROUND 1 GROUNDWATER GCMS CONFIRMATION DATA SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

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PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Sediment

SAMPLE ID	ANAL. TYPE		COMPOUND	CONC.	UNITS	DVQ	LQ
PP-SD05-01	TVOA	Hexane		7.000	ug/kg		J

26-Oct-1989 Page 1

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Sediment

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
PP-SD02-01						
	TBNA	Unknown	280.000	ug/kg		J
	TBNA TBNA	Octacosane Octacosane	270.000	ug/kg		j
	TBNA	Eicosane, 10-methyl-	170.000 160.000	ug/kg ug/kg		J
	TBNA	Unknown Phthalate	4400.000	ug/kg		j
	TBNA	Hexanedioic acid, dioctyl ester	230.000	ug/kg		J
	TBNA	Phosphoric acid, 2-ethylhexyl diphenyl ester	1100.000	ug/kg		J
PP-SD05-01						
•	TBNA	Unknown	310.000	ug/kg		J
	TBNA TBNA	Unknown	220.000	ug/kg		J
	IDNA	Tetratetracontane	280.000	ug/kg		J

# ROUND 1 LEACHATE RESULTS

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 LEACHATE DATA ANALYSIS TYPE: GW Indicators MATRIX: Leachate

	SAMPLE ID:	PP-LLA1-01	PP-LLE7-01	PP-LLE7-91	PP-LLF1-01	PP-LLK2-01	PP-LLMHW-01
	SAMPLE DATE:	4/08/88	4/08/88	4/08/88	4/08/88	4/08/88	4/08/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	11200.00	9090.00	9870.00	8520.00	7860.00	6060.00
Chloride	mg/l	17300.00	3740.00	4070.00	3630.00	2720.00	2490.00
Phenol	ug/l	3250.00 J/	560.00	550.00	1350.00	348.00	262.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 LEACHATE DATA
ANALYSIS TYPE: Volatiles MATRIX: Leachate

	MPLE ID: MPLE DATE:	PP-LLA1-01 4/08/88	PP-LLE7-01 4/08/88	PP-LLE7-91 4/08/88	PP-LLF1-01 4/08/88	PP-LLK2-01 4/08/88	PP-LLMHW-01 4/08/88
COMPOUNDS	UNIT						
Vinyl Chloride	ug/l						10.50 J/
Chloroethane	ug/l			0.83 R/			
1,1-Dichloroethan	e ug/l				22.00 R/	0.60 R/	
Benzene	ug/l		8.90 R/		1.40 J/	4.10 R/	2.97 J/
Toluene	ug/l	730.00 J/	106.10 R/		57.00 J/	165.60 R/	112.60 J/
Ch l orobenzene	ug/l			•	5.10 R/	•	
Ethylbenzene	ug/l		33.00 R/		5.70 J/	16.00 R/	36.60 J/
Styrene	ug/l		2.84 R/			8.65 R/	5.11 J/
cis-1,2-Dichloroe			15.20 R/	43.10 R/			5.40 J/
1.4-Dichlorobenze			2.54 R/	9.45 R/	7.80 R/		8.47 J/
m and p-Xylene	ug/l		27.40 R/	,,		25.10 R/	46.90 J/
o-Xylene	ug/l		33.70 R/		2.70 J/	28.40 R/	39.90 J/
1,2-Dichlorobenze			33.70 K		0.53 R/	25.40 K/	0.32 J/

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 LEACHATE DATA

ANALYSIS TYPE: Semi-Volatiles MATRIX: Leachate

	SAMPLE ID: SAMPLE DATE:	PP-LLA1-01 4/08/88	PP-LLE7-01 4/08/88	PP-LLE7-91 4/08/88	PP-LLF1-01 4/08/88	PP-LLK2-01 4/08/88	PP-LLMHW-01 4/08/88
COMPOUNDS	UNIT						
2-Methylpheno 2,4-Dimethylp No Compounds	henol ug/l	0.00	0.00	0.00	160.00	85.00	27.00

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 1 LEACHATE DATA

ANALYSIS TYPE: Pesticides/PCBs MATRIX: Leachate

SAMPLE I SAMPLE D		PP-LLA1-01 4/08/88	PP-LLE7-01 4/08/88	PP-LLE7-91 4/08/88	PP-LLF1-01 4/08/88	PP-LLK2-01 4/08/88	PP-LLMHW-01 4/08/88
COMPOUNDS	UNIT						
AROCLOR-1242 No Compounds Detected	ug/l ug/l	0.00	6.90 1/	5.00 J/	0.00	3.30 //	0.00

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 1 LEACHATE DATA ANALYSIS TYPE: Metals MATRIX: Leachate

	SAMPLE ID: SAMPLE DATE:	PP-LLA1-01 4/08/88	PP-LLE7-01 4/08/88	PP-LLE7-91 4/08/88	PP-LLF1-01 4/08/88	PP-LLK2-01 4/08/88	PP-LLMHW-01 4/08/88
COMPOUNDS	UNIT						
Aluminum	ug/l	1600.00	494.00	376.00	915.00	470.00	848.00
Antimony	ug/l				18.00 J/BN	11.00 /BN	40.00 /BN
Arsenic	ug/l	22.00 J/*	39.00 /*	37.00 /*	16.00 /*	32.00 /*	27.00 /*
Barium	ug/l	78.00 /B	636.00	493.00	239.00	254.00	426.00
Cadmium	ug/l	266.00	5.00				120100
Calcium	ug/l	241000.00	40300.00	31200.00 -	37000.00	29900.00	93100.00
Chromium, Tot	at ug/t	333.00	590.00	459.00	601.00	599.00	278.00
Cobalt	ug/l		57.00			56.00	59.00
Copper	ug/l	144.00			5720.00	22.00	25.00
Iron	ug/l	93100.00	6030.00	4820.00	6960.00	5470.00	11200.00
Lead	ug/l	180.00 /*	40.00 /*	38.00 /*	258.00 /*	140.00 /*	26.00 /*
Magnesium	ug/l	812000.00	136000.00	106000.00	70800.00	57100.00	110000.00
Manganese	ug/l	1960.00	48.00	37.00	72.00	46.00	558.00
Mercury	ug/l				, 2000	0.80	220.00
Nickel	ug/t	510.00	629.00	560.00	726.00	782.00	323.00
Potassium.	ug/l	1750000.00	1220000.00	1320000.00	1300000.00	710000.00	608000.00
Silver	ug/l	1.00 J/B			2.00 /B	1.00 /B	21.00 1/
Sodium	ug/l	10200000.00	1620000.00	1720000.00	1440000.00	1090000.00	968000.00
Vanad <b>i</b> um	ug/l					62.00	
Zinc	ug/l	6690.00	284.00	232.00	1280.00	394.00	268.00
Cyanide, Tota	il ug/l	38.00	6000.00 J/*	46.00 J/	40.00	124.00	423.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
PP-LLA1-01	TBNA TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Cis-Terpin Hydrate 2-hexen-1-ol, (Z)- Pentanoic acid, 4-methyl- Hexanoic acid, 2-methyl- Heptanoic acid Benzeneacetic acid Benzenepropanoic acid 2-Naphthalenemethanol, decahydroalpha, ., .alpha., 4A,8-tetramethyl-,	1100.000 2000.000 1800.000 1800.000 140.000 1500.000 1500.000 1500.000 1500.000 160.000 250.000 1500.000 240.000 2900.000 2900.000 200.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l		3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,
PP-LLE7-01	TBNA TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Unknown 2-Propanol, 1-[2-(2-Methoxy-1-Methylethoxy) -I-Methylethoxy] Benzoic Acid, 4-(1,1-Dimethylethyl)- Camphor (ACN) 3-Cyclohexene-1-methanol,	200.000 330.000 100.000 140.000 120.000 130.000 240.000 130.000	ug/1 ug/1 ug/1 ug/1 ug/1 ug/1 ug/1 ug/1		
	TBNA	.alpha., .alpha.,4-trimethyl-, (S)- Benzoic Acid, 4-methyl-	170.000	ug/1		J

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
	TBNA	Benzamide,	160.000	ug/l		J
	TBNA TBNA TBNA TBNA TBNA TBNA TBNA	n,n-diethýl-3-methyl- 2(3H)-Benzothiazolone Phenol, 3,4-dimethyl- Bicyclo[2.2.1]heptan-2-one, Phenol, 2,3-dimethyl- Phenol, 2,3-dimethyl- Phenol, 2-(1-methylethyl)- Propanedioic acid, phenyl-	210.000 110.000 130.000 110.000 250.000 280.000 100.000	ug/l ug/l ug/l ug/l ug/l ug/l		J J J J
PP-LLE7-91						_
	TBNA TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown	100.000 59.000 49.000 110.000 45.000 81.000 130.000 180.000 46.000 67.000 74.000 56.000 68.000 63.000 44.000 88.000	ug/  ug/  ug/  ug/  ug/  ug/  ug/  ug/		000000000000000000000000000000000000000
	TBNA TBNA	(S)- Cis-Terpin Hydrate Benzamide, n,n-diethyl-3-methyl-	49.000 88.000	ug/l ug/l		J
PP-LLF1-01	TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown	220.000 150.000 140.000 92.000 140.000 260.000			J J J

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
	TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Benzoic Acid,	280.000 96.000 230.000 110.000 150.000 530.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l		J J J J
	TBNA TBNA TBNA	4-(1,1-Dimethylethyl)- Sulfur, Mol. (S8) Camphor (ACN) 3-Cyclohexene-1-methanol, .alpha., .alpha.,4-trimethyl-, (S)-	140.000 700.000 580.000	ug/l ug/l ug/l		J J
·	TBNA TBNA TBNA TBNA	Benzoic Acid, 4-methyl- 2(3H)-Benzothiazolone Phenol, 2,3-dimethyl- Phenol, 3,5-dimethyl-	1200.000 140.000 260.000 130.000	ug/l ug/l ug/l ug/l		J J J
PP-LLK2-01	TBNA TBNA TBNA TBNA TBNA TBNA TBNA TBNA	Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Unknown Camphor (ACN) 3-Cyclohexene-1-methanol, alpha., alpha.,4-trimethyl-,	560.000 490.000 260.000 710.000 480.000 350.000 500.000 350.000 220.000 290.000 800.000 560.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l		
	TBNA TBNA	(S)- Benzene, (1-nitropropyl)- Benzamide, n,n-diethyl-3-methyl-	230.000 260.000	ug/1 ug/1		J
	TBNA TBNA	2(3H)-Benzothiazolone Phenol, 2-[1-(4-hydroxyphenyl)-1-methy	160.000 250.000	ug/1 ug/1		J
	TBNA TBNA	lethyl]- Phenol, 3,4-dimethyl- Bicyclo[3.1.1]heptan-2-one,	220.000 210.000	ug/1 ug/1		J

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
	TBNA	Benzoic acid, 3,4-dimethyl-	150.000	ug/l		J
PP-LLMHW-01	TBNA	Unknown	51.000	ug/]		j
	TBNA TBNA	Unknown Unknown	54.000 38.000	ug/l ug/l		J
	TBNA TBNA	Unknown Unknown	30.000 51.000	ug/l		7777777777
	TBNA	Unknown	29.000	ug/1		ž
	TBNA TBNA	Unknown Unknown	32.000 38.000	ug/l		j
	TBNA TBNA	Unknown Benzoic Acid,	130.000 43.000	ug/l ug/l		J
	TBNA	4-(1,1-Dimethylethyl)- Cyclohexanone,	60.000	ug/1		J
		3,3,5-trimethyl-				
	TBNA TBNA	Camphor (ACN) 3-Cyclohexene-1-methanol, .alpha., .alpha.,4-trimethyl-, (S)-	61.000 55.000	ug/l ug/l		J J
	TBNA	Cis-Terpin Hydrate	130.000			j
	TBNA TBNA	Benzoic Acid, 4-methyl- Benzene, (1-nitropropyl)-	120.000 74.000	ug/l ug/l		J
	TBNA	Benzamide, n,n-diethyl-3-methyl-	79.000	ug/1		J
	TBNA TBNA	2(3H)-Benzothiazolone Benzenesulfonamide, n-ethyl-4-methyl-	110.000 28.000	ug/l ug/l		J
	TBNA	Phenol, 2-[1-(4-hydroxyphenyl)-1-methy lethyl]-	220.000	ug/l		J

# ROUND 2 LEACHATE RESULTS

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 LEACHATE DATA
ANALYSIS TYPE: GW Indicators MATRIX: Leachate

	SAMPLE ID:	PP-LLA3-02	PP-LLA3-92	PP-LLB1-02	PP-LLG3-02	PP-LLG7-02	PP-LLMHE-02
	SAMPLE DATE:	6/15/88	6/15/88	6/15/88	6/16/88	6/16/88	6/16/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	9480.00	9360.00	13100.00	9540.00	11500.00	8230.00
Chloride	mg/l	7360.00	7310.00	6700.00	3430.00	3820.00	3710.00
Phenol	ug/l	410.00	405.00	12000.00	450.00	850.00	295.00

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 LEACHATE DATA ANALYSIS TYPE: GW Indicators MATRIX: Leachate

	SAMPLE ID: SAMPLE DATE:	PP-LLMHW-02 6/16/88
COMPOUNDS	UNIT	
Alkalinity Chloride Phenol	mg/l mg/l ug/l	10600.00 3840.00 380.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 2 LEACHATE DATA
ANALYSIS TYPE: Volatiles MATRIX: Leachate

	E ID: E DATE:	PP-LLA3-02 6/15/88	PP-LLA3-92 6/15/88	PP-LLB1-02 6/15/88	PP-LLG3-02 6/16/88	PP-LLG7-02 6/16/88	PP-LLMHE-02 6/16/88	PP-LLMHW-02 6/16/88
COMPOUNDS	UNIT							
Vinyl Chloride 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 1,1,1-Trichloroethan 1,2-Dichloropropane Benzene Toluene	ug/l ug/l ug/l ug/l ug/l ug/l ug/l	0.65 J/ 2.40 J/ 65.00 J/	1.00 J/ 55.00 J/	7.60 J/ 190.00 J/	6.60 J/ 38.00 J/ 27.00 J/ 12.00 J/ 1.10 J/ 4.30 J/	2.00 J/ 170.00 J/	20.00 J	<i>,</i>
Chlorobenzene Ethylbenzene Styrene No Compounds Detecte trans-1,2-Dichloroet cis-1,2-Dichloroethe 1,4-Dichlorobenzene m and p-Xylene o-Xylene 1,2-Dichlorobenzene	ug/l ug/t ug/t d ug/l hene ug/l	16.00 J/ 20.00 J/ 21.00 J/ 20.00 J/ 21.00 J/ 0.96 J/	0.27 J/ 2.00 J/ 12.00 J/ 17.00 J/ 18.00 J/ 0.51 J/	1.00 J/ 2.60 J/ 17.00 J/ 51.00 J/ 62.00 J/ 2.60 J/	49.00 J/ 12.00 J/ 1.60 J/	5.00 J/ • 18.00 J/ 31.00 J/	22.00 J, 18.00 J,	

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 LEACHATE DATA ANALYSIS TYPE: Metals MATRIX: Leachate

	SAMPLE ID: SAMPLE DATE:	PP-LLA3-02 6/15/88	PP-LLA3-92 6/15/88	PP-LLB1-02 6/15/88	PP-LLG3-02 6/16/88	PP-LLG7-02 6/16/88	PP-LLMHE-02 6/16/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium	ug/l ug/l ug/l	76.00 J/ 520.00 J/ 80.00 J/	149.00 J/ 2200.00 J/ 170.00 J/	8.00 350.00 7.40	34.00 260.00 1.10	15.00 200.00 3.00	24.00 330.00

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 2 LEACHATE DATA ANALYSIS TYPE: Metals MATRIX: Leachate

	SAMPLE ID: SAMPLE DATE:	PP-LLNHW-02 6/16/88		
COMPOUNDS	UNIT			
Arsenic Barium Cadmium	ug/l ug/l ug/l	67.00 720.00 30.00		

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

# ROUND 3 LEACHATE RESULTS

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 3 LEACHATE DATA
ANALYSIS TYPE: GW Indicators MATRIX: Leachate

	SAMPLE ID:	PP-LLC3-03	PP-LLC3-93	PP-LLC6-03	PP-LLH2-03	PP-LL15-03
	SAMPLE DATE:	_8/03/88	8/03/88	8/03/88	8/03/88	8/03/88
COMPOUNDS	UNIT					
Alkalinity	mg/l	3480.00	3560.00	2600.00	10900.00	9220.00
Chloride	mg/l	2460.00	2440.00	1160.00	4090.00	3810.00
Phenol	ug/l	210.00	201.00	920.00	780.00 /*	1200.00
Field pH	s.u.	6.98	7.01	6.63	7.85	7.95
Field Conductiv	ity umho/cm	12500.00	12500.00	6520.00	27200.00	23400.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 3 LEACHATE DATA
ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE II SAMPLE D		PP-LLC3-03 8/03/88	PP-LLC3-93 8/03/88	PP-LLC6-03 8/03/88	PP-LLH2-03 8/03/88	PP-LLI5-03 8/03/88
COMPOUNDS	UNIT					
1,2-Dichloropropane	ug/l	0.38 J/	2.00 J/	0.23 J/		
Benzene	ug/l	7.00 J/	6.80 J/	6.50 J/		
Toluene	ug/l	24.00 J/	20.00 J/	35.00 J/	119.00 J/	125.00 J/
Chlorobenzene	ug/l	0.34 J/	1.00 J/	1.20 J/	-	
Ethylbenzene	ug/l	2.40 J/	2.30 J/	5.00 J/		
Styrene	ug/l	2.50 J/	2.40 J/	2.20 J/	3.90 J/	10.00 J/
cis-1,2-Dichloroethene	ug/l		0.32 J/	·	6.90 J/	68.00 J/
1,4-Dichlorobenzene	ug/l	26.00 J/	30.00 J/	25.00 J/	5.40 J/	17.00 J/
m and p-Xylene	ug/l	53.00 J/	45.00 J/	103.00 J/	55.00 J/	34.00 J/
o-Xylene	ug/l	43.00 J/	40.00 J/	61.00 J/	30.00 J/	28.00 J/
1.2-Dichlorobenzene	ug/l		0.36 1/			

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 3 LEACHATE DATA ANALYSIS TYPE: Metals MATRIX: Leachate

	SAMPLE ID:	PP-LLC3-03	PP-LLC3-93	PP-LLC6-03	PP-LLH2-03	PP-LL15-03
	SAMPLE DATE:	8/03/88	8/03/88	8/03/88	8/03/88	8/03/88
COMPOUNDS	UNIT					
Arsenic	ug/l	24.00	16.00 /s	138.00	10.00	14.00
Barium	ug/l	1130.00	1040.00	1030.00	147.00	240.00 /s
Cadmium	ug/l	1.00	1.00	170.00	1.00 J/+S	1.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

ROUND 4
LEACHATE RESULTS

*5 --- 1

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 4 LEACHATE DATA
ANALYSIS TYPE: GW Indicators MATRIX: Leachate

	SAMPLE ID:	PP-LLD1-04	PP-LLD1-94	PP-LLF7-04	PP-LLG4-04	PP-LLMHE-04	PP-SB01-04
	SAMPLE DATE:	6/08/89	6/08/89	6/08/89	6/08/89	6/08/89	6/08/89
COMPOUNDS	UNIT						
Alkalinity	mg/l	10300.00 J/	9890.00 J/	5630.00 J/	10800.00 J/	6920.00 J/	5.00 UJ/U
Chloride	mg/l	5000.00 J/	5000.00 J/	2200.00 J/	4300.00 J/	3250.00 J/	7.00 J/
Phenol	ug/l	460.00 J/	490.00 J/	240.00 J/	1200.00 J/	230.00 J/	20.00 J/
Field pH	s.u.	7.65	7.68	7.71	7.99	7.95	8.30
Field Conductiv	rity umho/cm	28000.00	28000.00	15200.00	30700.00	19500.00	10.00 /U

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL ROUND 4 LEACHATE DATA
ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE ID Sample da		PP-LLD1-04 6/08/89	PP-LLD1-94 6/08/89	PP-LLF7-04 6/08/89	PP-LLG4-04 6/08/89	PP-LLMHE-04 6/08/89
COMPOUNDS	UNIT					
Chloromethane	ug/l	2.00 /J	3.00 /J			
Vinyl Chloride	ug/l	54.00	55.00	12.00		3.00 /J
Chloroethane	ug/l	10.00	11.00			
Methylene Chloride	ug/l	13.00 /B	10.00 /B	5.00 UJ/BJ	5.00 UJ/BJ	5.00 UJ/BJ
Acetone	ug/l	14000.00 J/BD	18000.00 J/BD	76.00 J/	310.00 UJ/BD	28.00 UJ/B
1,1-Dichloroethane	ug/l	53.00	57.00			
Total 1,2-Dichloroethene	ug/l	21.00	22.00		220.00 /D	6.00
2-Butanone	ug/l	22000.00 J/D	20000.00 J/D	26.00 J/	22.00 J/DJ	10.00 R/U
1,2-Dichloropropane	ug/l	3.00 /J	3.00 /J			
4-Methyl-2-Pentanone	ug/l	1600.00 /DJ	1400.00 /DJ			
2-Hexanone	ug/l	240.00 J/E	260.00 J/E		65.00	
Tetrachloroethene	ug/l				17.00	
Toluene	ug/l	320.00 J/E	310.00 J/E	47.00 J/	150.00 J/	18.00 J/
Chlorobenzene	ug/l	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U
Ethylbenzene	ug/t	49.00 J/	49.00 J/	65.00 J/	77.00 J/	5.00 UJ/U
Styrene	ug/l	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U	5.00 UJ/U
Total Xylenes	ug/l	190.00 J/X	170.00 J/X	230.00 J/X	300.00 J/X	80.00 J/X

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL ROUND 4 LEACHATE DATA ANALYSIS TYPE: Metals MATRIX: Leachate

	SAMPLE ID:	PP-LLD1-04	PP-LLD1-94	PP-LLF7-04	PP-LLG4-04	PP-LLMHE-04	PP-SB01-04
	SAMPLE DATE:	6/08/89	6/08/89	6/08/89	6/08/89	6/08/89	6/08/89
COMPOUNDS	UNIT						
Arsenic	ug/l	17.40 J/NS	16.70 J/NS	23.50 J/NS	31.00 J/N+	240.00 J/NS	2.00 UJ/UN+
Barium	ug/l	265.00 /*	246.00 /*	2450.00 /s*	468.00 /*	4710.00 /s*	86.00 /*
Cadmium	ug/l	22.90 /s*	19.50 /s*	1.70 /s*	2.60 /\$*	117.00 /s*	0.20 /US*

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

# APPENDIX C ROUND 4 LEACHATES SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Leachate

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
PP-LLDI-04	TVOA TVOA TVOA TVOA TVOA TVOA TVOA TVOA	Silanol, trimethyl 4-Penten-2-ol Furan, tetrahydro- 2-Butanol, 3-methyl- 2-Butanone, 3-methyl- 2-Pentanol, 4-methyl- 3-Pentanone, 2,4-dimethyl- 2-Hexanone, 5-methyl- Cineole (van) Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-,(+-)-	23.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l		JX J JX J J
PP-LLD1-94	TVOÀ TVOA TVOA TVOA TVOA TVOA TVOA TVOA TVOA	Unknown Silanol, trimethyl 4-Penten-2-ol Furan, tetrahydro- 2-Butanol, 3-methyl- 2-Butanone, 3-methyl- 2-Pentanol, 4-methyl- 2-Hexanone, 5-methyl- Cineole (van) Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-,(+-)-	12.000 72.000 44.000 230.000 140.000 110.000 24.000 23.000 15.000 33.000	ug/] ug/] ug/] ug/] ug/] ug/] ug/] ug/]		J J J J J J J
PP-LLF7-04	TVOA TVOA TVOA TVOA TVOA TVOA TVOA TVOA	Unknown Unknown Silanol, trimethyl Furan, tetrahydro- 3-Pentanone, 2,4-dimethyl- Cineole (van) Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-,(+-)- 2-Butanol, 2-methylAlphapinene (ACN) 7-Oxabicyclo[2.2.1]heptane, 1-methl-4-(1-methylethyl)-	32.000 140.000 15.000 42.000	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l		JX JX JX JX JX JX

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# APPENDIX C ROUND 4 LEACHATES SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Leachate

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
	TVOA TVOA TVOA TVOA TVOA TVOA	Unknown Silanol, trimethyl Furan, tetrahydro- 2-Butanone, 3-methyl- 3-Pentanone, 2,4-dimethyl- Cineole (van) Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-,(+-)-	27.000 71.000 30.000 6.900 5.600 6.800 44.000	ug/l ug/l ug/l ug/l ug/l ug/l		J JX J J J
	TVOA	3-Carene	27.000	ug/l		J
PP-LLMHE-04	TVOA TVOA TVOA TVOA	Silanol, trimethyl Furan, tetrahydro- 3-Pentanone, 2,4-dimethyl- Bicyclo[2.2.1]heptan-2-one, 1,7,7-trimethyl-,(+-)- Ethyl ether	20.000 11.000 7.300 9.300	ug/l ug/l ug/l ug/l		JX J J J

RESULTS FOR BLANKS

Charles All A.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Blank

	SAMPLE ID: SAMPLE DATE:	PP-FB01-01 4/05/88	PP-FB02-01 4/06/88	PP-FB03-01 4/07/88	.PP-F804-01 4/08/88	PP-LLFB01-01 4/08/88	PP-LLSB04-02 6/16/88
COMPOUNDS	UNIT						
Alkalinity Chloride Phenol Field pH Field Conducti	ng/l ng/l ug/l s.u. vity unho/cm	6.00	8.00 7.00	5.00 /U 1.00 /U 5.00 /U	5.00 /U 1.00 /U 5.00 /U	5.00 /U 1.00 /U 5.00 /U	12.00

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: GW Indicators MATRIX: Blank

	SAMPLE ID: SAMPLE DATE:	PP-\$801-02 6/20/88	PP-\$801-03 8/03/88	PP-\$B01-04 6/08/89	PP-SB02-02 6/14/88	PP-SB03-02 6/15/88
COMPOUNDS	UNIT					
Alkalinity	mg/l	6.00		5.00 UJ/U	6.00	
Chloride	mg/l	1.00		7.00 J/	1.00	1.00
Phenol	ug/l	5.00	5.00	20.00 J/	6.00	14.00
Field pH	s.u.			8.30		
Field Conductivi	itv umho/cm			10.00 /U		

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Metals MATRIX: Blank

	SAMPLE ID: SAMPLE DATE:	PP-FB01-01 4/05/88	PP-FB02-01 4/06/88	.PP-FB03-01 4/07/88	PP-FB04-01 4/08/88	PP-LLF801-01 4/08/88	PP-LL\$B04-02 6/16/88
COMPOUNDS	UNIT						
Arsenic Barium Cadmium Nickel No Compounds De	ug/l ug/l ug/l ug/l tected ug/l	43.00	0.00	0.00	0.20	42.00	2.00 /U 5.00 /U 0.20 /U

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Metals MATRIX: Blank

	AMPLE ID: AMPLE DATE:	PP-SB01-02 _6/20/88	PP-SB01-03 8/03/88	PP-SB01-04 6/08/89	PP-SB02-02 6/14/88	PP-\$B03-02 6/15/88
COMPOUNDS	TINU					
Arsenic Barium	ug/l	2.00 /U	2.00 /U	2.00 UJ/UN+	2.00 /U	2.00 /U
Cadmium	ug/l ug/l	5.00 /U 0.20 /U	5.00 /U 0.20 /U	86.00 /* 0.20 /US*	5.00 /U 0.20 /U	5.00 /U 0.20 /U
Nickel No Compounds Deta	ug/l ected ug/l					

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Volatiles MATRIX: Blank

	MPLE ID: MPLE DATE:	PP-FB01-01 4/04/88	PP-FB02-01 4/06/88	PP-FB03-01 4/07/88	PP-FB04-01 4/08/88	PP-LLFB01-01 4/08/88	PP-LLSB04-02 6/16/88
COMPOUNDS	UNIT						
Chloroethane Methylene Chlorid		20.00		18.20	1.40	2.25 J/	
Acetone 1,1-Dichloroethan Chloroform	ug/l e ug/l ug/l					0.39 J/	0.27 J/
2-Butanone 1,1,1-Trichloroeti	ug/l hane ug/l			•		0.91 J/ 0.48 J/	·
Trichloroethene Dibromochlorometha Benzene	ug/l ane ug/l ug/l					0.48 J/	
trans-1,3-Dichlore Tetrachloroethene Toluene					1,70		
Chlorobenzene Ethylbenzene	ug/l ug/l				1.,,0		
Styrene Total Xylenes No Compounds Deter	ug/l ug/l cted ug/l						
trans-1,2-Dichlore cis-1,2-Dichlore 1,4-Dichlorobenzer	oethene ug/l thene ug/l		0.37 J/			0.32 J/	
m and p-Xylene 1,2-Dichlorobenzer	ug/l			1.25		1.42 J/	

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Volatiles MATRIX: Blank

	PLE ID: PLE DATE:	PP-SB01-02 6/20/88	PP-\$B01-03 8/03/88	PP-SB01-04 6/08/89	PP-SB02-02 6/14/88	PP-\$B03-02 6/15/88	PP-TB01-02 6/20/88
COMPOUNDS	UNIT						
Chloroethane	ug/l						
Methylene Chloride	ug/l			5.00 UJ/BJ			
Acetone	ug/l						
1,1-Dichloroethane	ug/l						
Chloroform	ug/l			_			
2-Butanone	ug/l			10.00 Ř/U			
1,1,1-Trichloroetha	ane ug/l						
Trichloroethene	ug/l						
Dibromochloromethan	ne ug/l						
Benzene	ug/l						
trans-1,3-Dichlorop	oropene ug/l						
Tetrachloroethene	ug/l						
Toluene	ug/l			5.00 UJ/U			
Chlorobenzene	ug/l			5.00 UJ/U			
Ethylbenzene	ug/l			5.00 UJ/U			
Styrene	ug/l			5.00 UJ/U			
Total Xylenes	ug/l			5.00 UJ/U			
No Compounds Detect	ted ug/l	0.00	0.00		0.00	0.00	0.00
trans-1,2-Dichloroe							
cis-1,2-Dichloroeth							
1,4-Dichlorobenzene							
m and p-Xylene	ug/l						
1,2-Dichlorobenzene	e ug/l						

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Volatiles MATRIX: Blank

SAMPLE ID: SAMPLE DAT		PP-TB01-03 8/03/88	PP-TB01-04 6/08/89	PP-TB02-02 6/14/88	PP-TB03-02 6/15/88	PP-TB04-02 6/15/88
COMPOUNDS	UNIT					
Chloroethane	ug/l					
Methylene Chloride	ug/l		5.00 UJ/BJ			
Acetone	ug/l		37.00 UJ/B			
1,1-Dichloroethane	ug/l					
Chloroform	ug/l					
2-Butanone	ug/l		10.00 R/U			
1,1,1-Trichloroethane	ug/l					
Trichloroethene	ug/l					
Dibromochloromethane	ug/l					0.31
Benzene	ug/l					
trans-1,3-Dichloropropene	ug/l	0.23 J/				
Tetrachloroethene	ug/l					0,22
Toluene	`ug/l		5.00 UJ/U			
Chlorobenzene	ug/l	0.75 J/	5.00 UJ/U			
Ethylbenzen <del>e</del>	ug/l		5.00 UJ/U			
Styrene	ug/l		5.00 UJ/U			
Total Xylenes	ug/l		5.00 UJ/U			
No Compounds Detected	ug/l			0.00	0.00	
trans-1,2-Dichloroethene	ug/l	0.36				
cis-1,2-Dichloroethene	ug/l	2.80	•			
1,4-Dichlorobenzene	ug/l	39.00 J/				
m and p-Xylene	ug/l					
1,2-Dichlorobenzene	ug/l	3.00 J/				

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Semi-Volatiles MATRIX: Blank

SAMPLE ID: SAMPLE DATE: PP-FB01-01 4/04/88 PP-LLF801-01 4/08/88

COMPOUNDS

UNIT

No Compounds Detected

ug/l 0.00

0.00

Page 1 ·

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL BLANK SUMMARY ANALYSIS TYPE: Pesticides/PCBs MATRIX: Blank

# APPENDIX C BLANKS SUMMARY OF TENTATIVELY IDENTIFIED COMPOUNDS

26-Oct-1989 Page I

PROJECT NAME: WINNEBAGO RECLAMATION LANDFILL PROJECT NUMBER: 13160.00

MATRIX: Leachate

SAMPLE ID	ANAL. TYPE	COMPOUND	CONC.	UNITS	DVQ	LQ
PP-SB01-04	TVOA	Acetaldehyde (DOT)	17.000	ug/l		J

GC/MS CONFIRMATION RESULTS

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 1 ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE ID: SAMPLE DATE	E:	PP-B11-01 _4/07/88	PP-B16-01 4/07/88	PP-G107-01 4/06/88	PP-G119-01 4/04/88	PP-PW1-01 4/05/88
COMPOUNDS	UNIT					
1,1-Dichloroethane	ug/l		0.87 J/			
Total 1,2-Dichloroethene	ug/l	0.47	23.00	1.50		
1,1,1-Trichloroethane	ug/l		3.25	0.42 /J		
Trichloroethene	ug/l	0.27	2.76	0.42		
Tetrachloroethene	ug/l	1.00	1.78	0.46		
No Compounds Detected	ug/l				0.00	0.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 1 AMALYSIS TYPE: Volatiles MATRIX: Surface Water

SAMPLE ID: SAMPLE DATE: PP-SW02-01

4/8/88

COMPOUNDS

UNIT

Chloroform

ug/l

0.29

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 1 ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE ID: SAMPLE DATI	E:	PP-LLMHW-01 4/08/88
COMPOUNDS	UNIT	
Vinyl Chloride	ug/l	12.00
Total 1,2-Dichloroethene	ug/l	4.30
Chloroform	ug/l	16.00
Toluene	ug/l	67.00 /B
Ethylbenzene	ug/l	21.00
Total Xylenes	ug/l	89.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 2
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE I SAMPLE D		PP-PWO-02 6/15/88	PP-809-02 6/15/88	PP-B11A-02 6/14/88	PP-G115-02 6/14/88	PP-G119A-02 6/20/88
COMPOUNDS	UNIT					
Vinyl Chloride	ug/l				2.40	
Chloroethane	ug/l				6.70	
1,1-Dichloroethene	ug/l					0.11 /J
1,1-Dichloroethane	ug/l			1.80	1.70	0.14 /J
Total 1,2-Dichloroethen				5.60	2.60	1.20
1.1.1-Trichloroethane	ug/l			0.94		0.57 /J
1,2-Dichloropropane	ug/l				0.65	
Trichloroethene	ug/l			1.80	0.16 /J	0.76
Benzene	ug/l				1.10	
Tetrachloroethene	ug/l			4.50 /B		0.48 /B
Chlorobenzene	ug/l				0.68	
Methylene Chloride	ug/l	1.40 U/B	0.94 U/B			
Acetone	ug/l	3.60 U/B	27.00 U/I	3		
Chloroform	ug/l	0.62 U/BJ				
Toluene	ug/l	0.17 U/B	0.10 U/B.	J		

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL GC/MS CONFIRMATION DATA RD 2 ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE ID: SAMPLE DATI	E:	PP-LLG7-02 6/16/88
COMPOUNDS	UNIT	
Vinyl Chloride	ug/l	90.00
Total 1,2-Dichloroethene	ug/l	24.00
Benzene	ug/l	6.20 /B
Toluene	ug/l	270.00 /B
Ethylbenzene	ug/l	56.00 /B
Total Xylenes	ug/l	130.00 /B

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

HISTORICAL GROUNDWATER DATA
VOLATILE ORGANIC COMPOUNDS

SAMPLE ID: Sample dati	E:	PP-B01 10/25/82	PP-B01 9/06/83	PP-B01 5/01/84	PP-802 10/25/82	PP-B02 9/06/83	PP-B02 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l	5.00 /U	7.00			19.00	
Acetone	ug/l				100.00 /U		
1,1-Dichloroethene	ug/l	5.00					
1 1-Dichloroethane	ug/l	7.20		2.40	5.00 /U		2.70
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l	5.00 /U					
1,2-Dichloroethane	ug/l	5.00 /U					
1,1,1-Trichloroethane	ug/l	64.00	15.00	45.00	28.00	28.00	36.00
Carbon Tetrachloride	ug/l				5.00 /U		
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l				5.00 /U		
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l	33.00	5.00	18.00	57.00	43.00	40.00
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	54.00	19.00	48.00	22.00	22.00	25.00
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l				5.00 /U		
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l	57.00		18.00	12.00	9.00	5.10
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xyl ene	ug/l						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE	: <b>:</b>	PP-803 10/25/82	PP-803 9/06/83	PP-B03 5/01/84	PP-B04 10/25/82	PP-804 9/06/83	PP-B04 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l		7.00			160.00	
Acetone	ug/l						
1,1-Dichloroethene	ug/l				19.00		13.00
1,1-Dichloroethane	ug/!				190.00	260.00	150.00
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l				5.00 /u		
1,2-Dichloroethane	ug/l				11.00		
1,1,1-Trichloroethane	ug/l				600.00	660.00	240.00
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l				7.80		
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l				790.00	800.00	170.00
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l				7.20		
Benzene	ug/l				5.00 /U		
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l	100.00 /U					
Tetrachloroethene	ug/l				500.00	2700.00	470.00
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l	5.00 /U			5.00 /U	41.00	40.00
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						31.00
Styrene	ug/l						
Total Xylenes	ug/l						280.00
No Compounds Detected	ug/l			0.00			
trans-1,2-Dichloroethene	ug/l				410.00	1500.00	2400.00 /J
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
n-Xylene	ug/l				5.00 /U		
1,2-Dichlorobenzene	ug∕l						
Fluorotrichloromethane	ug/l				5.00 /U		
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-804-01 4/05/88	PP-B04-02 6/15/88	PP-804-0UP 10/25/82	PP-805 10/25/82	PP-805 9/06/83	PP-805 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l	5.00					
Vinyl Chloride	ug/l	3.00	1.80 J/				
Chloroethane	ug/l		4.30 1/	5.00 /U			
Methylene Chloride	ug/l					6.00	
Acetone	ug/l				160.00		
1,1-Dichloroethene	ug/l		6.00 1/	17.00			
1,1-Dichloroethane	uą/l	190.00 J/	170.00	160.00	5.00 /U		14.00
Total 1,2-Dichloroethene	ug/l			-			
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	3.20	13.00 J/	9.30			
1,1,1-Trichloroethane	ug/l	310.00 J/	350.00	560.00	5.00 /U		13.00
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	5.70	8.90 J/	7.50			
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l	380.00 1/	350.00	860.00	5.00 /U	2.00	4.30
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l	0.78	4.00 J/	6.20			
Benzene	ug/l	3.60 J/	1.90 J/	5.00 /U			
trans-1,3-Dichloropropene							
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	550.00 J/	810.00	11100.00	6.10		
1,1,2,2-Tetrachloroethane							
Toluene	ug/l	3.00 J/	1.70 J/	5.00 /U			
Chlorobenzene	ug/l		,				
Ethylbenzene	ug/l	11.00 J/					
Styrene	ug/l				5.00 /U		
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l		0.68 J/	350,00	28.00	21.00	74.00
cis-1,2-Dichloroethene	ug/l	1200.00 J/	750.00				
1.4-Dichlorobenzene	ug/l	.200.00	.,,,,,,				
m and p-Xylene	ug/l	9.70 J/	3.90 1/				
o-Xylene	ا/وں	24.00 J/	9.20 J/	5.00 /U			
1,2-Dichlorobenzene	ug/l	2	,	2.23 / 6			
Fluorotrichloromethane	ug/l			5.00 /U			
2-Chloroethylvinyl ether	ug/l			2.03 /0			

SAMPLE ID: SAMPLE DATE:		PP-806 5/01/84	PP-8060 10/25/82	PP-8060 9/06/83	PP-8060-01 4/07/88	PP-B060-02 6/15/88	PP-806D-92 6/15/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l				5.20		
Acetone	ug/l						_
1,1-Dichloroethene	ug/l					0.56	0.54
1,1-Dichloroethane	ug/l					8.20	8.10
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l					2.00	2.00
1,1,1-Trichloroethane	ug/t					1.20	0.94
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						0.22
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l					0.58	0.37
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l		22.00				
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l			0.00			
trans-1,2-Dichloroethene	ug/l	5.10					
cis-1,2-Dichloroethene	ug/l				6.60	88.00	86.00
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xyl <b>ene</b>	ug/l						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE IO Sample da	-	PP-8060-DUP 10/25/82	PP-B06\$ 10/25/82	PP-806\$ 9/06/83	PP-806S 5/01/84	PP-806S-01 4/07/88	PP-806S-02 6/15/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l			15.00		5.21	
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l					0.59	0.78
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l						
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloroproper	e ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l			11.00			0.51
1,1,2,2-Tetrachloroethar	e ug/l					0.28	
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l	0.00	0.00		0.00		
trans-1,2-Dichloroethene	e ug/l						
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
a-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE	:	PP-B07 10/25/82	PP-B07 9/06/83	PP-807 5/01/84	PP-B07-01 4/07/88	PP-807-02 6/15/88	PP-808 10/25/82
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l		7.00		9.81 R/		/00.00
Acetone	ug/l	230.00					400.00
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l				0.50		
1,1,1-Trichloroethane	ug/l				0.50		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l						
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/t						
Benzene	ug/l						
trans-1,3-Dichloropropene							
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						
1,1,2,2-Tetrachloroethane							5 00 41
Toluene	ug/l						5.00 /U
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l					0.00	
trans-1,2-Dichloroethene	ug/l		33.00	3.00			
cis-1,2-Dichloroethene	ug/l				0.40		
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xyleik	ug/l						
1,2-Dichlorobenzene	ug/l						
fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/i						

SAMPLE ID: SAMPLE DAT		PP-808 9/06/83	PP-B08 5/01/84	PP-B08 12/27/84	PP-808 1/02/85	PP-809 10/25/82	PP-B09 9/06/83
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l	7.00					13.00
· Acetone	ug/l					1300.00	
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroethene	ug/l			0.40	0.30		
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l			0.10	0.20		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l	3.00					
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l		0.00				
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-809 5/01/84	PP-809 12/27/84	PP-B09 1/02/85	PP-809-01 4/05/88	PP-B09-02 6/15/88	PP-B10 10/25/82
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						11.00
Chloroethane	ug/l						
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l						5 00 44
1,1-Dichloroethane	ug/l						5.00 /U
Total 1,2-Dichloroethene	ug/l			0.30			
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l						5.00 /U
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						10.00 /
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l			0.20			9.00
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						7.00
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						10.00
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l	0.00	0.00		0.00	0.00	
trans-1,2-Dichloroethene	ug/l	****					65.00
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l			0.30			
m and p-Xylene	ug/l			2.30			
o-Xylene	ug/!						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

Chloromethane   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L   Ug/L	SAMPLE ID: SAMPLE DATE:		PP-B10 9/06/83	PP-810 5/01/84	PP-810 12/28/84	PP-B10 1/03/85	PP-B10-01 4/06/88	PP-B10-02 6/14/88
Viny (Chloride   Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L   Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L   Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L   Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L     Ug/L	COMPOUNDS	UNIT						
Chloroethane	Chloromethane	ug/l						
Nethylene Chloride						0.80		0.20
Acetone ug/l 1,1-Dichloroethene ug/l 1,1-Dichloroethene ug/l 1,1-Dichloroethene ug/l 1,2-Dichloroethene ug/l 2.00 2.00 2.50 J/ 3.10 2.10 2.10 2.10 2.10 2.10 2.10 2.10 2								0.29
1,1-Dichloroethene			5.00					
1,1-pichloroethane								
Total 1,2-Dichloroethene Ug/L Ug/L Ug/L Ug/L Ug/L Ug/L Ug/L Ug/L						4 ==		4 30
Chloroform ug/l 1,2-Dichloroethane ug/l 1,1,1-Trichloroethane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,2-Dichloropropane ug/l 1,1,2-Trichloroethane ug/l Benzene ug/l 2.00 4.30 3.10 J/ 4.60 Dibromochloromethane ug/l Benzene ug/l 2-Nexamone ug/l 2-Nexamone ug/l 2-Nexamone ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Tetrachloropropane ug/l 2-Nexamone ug/l 3.60 2.90 2.50 J/ 3.10 1,1,2,2-Tetrachloropropane ug/l 2-Nexamone ug/l 3-10 3.60 2.90 2.50 J/ 3.10 1,1,2,2-Tetrachloropropane ug/l 3-10 0.20 Ethylbenzene ug/l Chlorobenzene ug/l 3-10 0.20 Ethylbenzene ug/l 3-2-Dichloropropane ug/l 3-2-Dichloropropane ug/l 3-2-Dichloropropane ug/l 3-3-Dichloropropane ug/l 3-0-Dichloropropane ug/l							0.91 J/	1.30
1,2-Dichloroethane ug/l Carbon Tetrachloride Ug/l Bromodichloromethane 1,2-Dichloropropene Ug/l 1,2-Dichloropropene Ug/l 1,2-Dichloropropene Ug/l 1,2-Trichloroethane Ug/l 1,1,2-Trichloroethane Ug/l 2.00 2.00 3.60 2.90 2.50 J/ 3.10 3.10 3.10 3.10 3.10 3.10 3.10 3.10					48.00	81.00		
1,1-Trichloroethane								
Carbon Tetrachloride ug/t Bromodichloromethane ug/t 1,2-Dichloropropane ug/t 1,2-Dichloropropane ug/t 7,00							4 50 14	
Bromodichloromethane   Ug/L						1.90	1.80 J/	4.00
1,2-Dichloropropane								
Cia-1,3-Dichtoropropene						4.40	0.73.44	1.00
Trichloroethene ug/L 7.00 4.30 3.10 J/ 4.60 Dibromochloromethane ug/L yd/L 2.00 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J/ 5.50 J						1.60	0.32 1/	1.00
Dibromochloromethane   Ug/l					2.20	/ 70	7 40 17	/ 40
1,1,2-Trichtoroethane   Ug/L   Ug/L     2.00     0.60			7.00			4.30	3.10 4/	4.60
Benzene								
trans-1,3-Dichloropropene ug/l 2-Hexanone ug/l Tetrachloroethene ug/l 7.00 3.60 2.90 2.50 J/ 3.10 1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Chlorobenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 132.00 18.00 1,4-Dichloroethene ug/l 1,4-Dichloroethene ug/l 1,2-Dichloroethene ug/l						0.40		
2-Hexanone ug/l Tetrachloroethene ug/l 7.00 3.60 2.90 2.50 J/ 3.10  1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l 0.40 0.60 18.00 J/ 20.00  1,4-Dichlorobenzene ug/l 0-Xylene ug/l 1,2-Dichloroethene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l			2.00			0.80	0.53.17	
Tetrachloroethene ug/l 7.00 3.60 2.90 2.50 J/ 3.10  1,1,2,2-Tetrachloroethane ug/l Totuene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l 0.40 0.60 18.00 J/ 20.00  1,4-Dichlorobenzene ug/l 0-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l							0.52 1/	
1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l 0.20  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18.00  18					<b>-</b>	2.00	2.50	7 10
Toluene ug/l Chlorobenzene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 32.00 18.00 cis-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l o-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l fluorotrichloromethane ug/l Fluorotrichloromethane ug/l			7.00		3.60	2.90	2.50 J/	3.10
Chlorobenzene ug/l 0.20 Ethylbenzene ug/l 2.00 Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 32.00 18.00  cis-1,2-Dichloroethene ug/l 32.00 18.00 1,4-Dichlorobenzene ug/l 0.40 0.60 0.33  m and p-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l								
Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 32.00 18.00  cis-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l mand p-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l						0.00		
Styrene								
Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 32.00 18.00  cis-1,2-Dichloroethene ug/l 0.40 0.60 18.00 J/ 20.00 1,4-Dichlorobenzene ug/l 0.40 0.60 0.33  m and p-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l		•				2.00		
No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 32.00 18.00 18.00 18.00 18.00 J/ 20.00 18.00 J/ 20.00 18.00 J/ 20.00 19.00 J/ 20.00 19.00 J/ 20.00 19.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/ 20.00 J/								
trans-1,2-Dichloroethene ug/l 32.00 18.00  cis-1,2-Dichloroethene ug/l 18.00 18.00 18.00 18.00 J/ 20.00  1,4-Dichlorobenzene ug/l 0.40 0.60 0.33  m and p-Xylene ug/l  1,2-Dichlorobenzene ug/l  1,2-Dichlorobenzene ug/l  Fluorotrichloromethane ug/l								
cis-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l m and p-Xylene ug/l o-Xylene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l			70.00	40.00				
1,4-Dichlorobenzene ug/l 0.40 0.60 0.33  m and p-Xylene ug/l o-Xylene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l			32.00	18.00			10.00.44	20.00
m and p-Xylene ug/l o-Xylene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l					0.70	0.40	10.00 1/	
o-Xylene ug/l 1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l					0.40	0.00		0.33
1,2-Dichlorobenzene ug/l Fluorotrichloromethane ug/l		_						
Fluorotrichloromethane ug/l								
	2-Chloroethylvinyl ether	ug/l ug/l						

	SAMPLE ID: SAMPLE DATE:		PP-B10A 12/28/84	PP-B10A 1/03/85	PP-B11 10/25/82	PP-B11 9/06/83	PP-B11 5/01/84	PP-B11 12/28/84
COMPOUNDS		UNIT						
Chloromethane		ug/l						
Vinyl Chloride		ug/l						
Chloroethane		ug/l						
Methylene Chlo	ride	ug/l				130.00		
Acetone		ug/l			630.00			
1,1-Dichloroet	hene	ug/i						
1,1-Dichloroet	hane	ug/l	0.70	0.70				1.20
Total 1,2-Dich	loroethene	ug/l	44.00	47.00				2.30
Chloroform		ug/l						
1,2-Dichloroet	:hane	ug/l						
1,1,1-Trichlor	oethane	ug/l	2.90	3.10				0.20
Carbon Tetrach	loride	ug/l						
Bromodichlorom	ethane	ug/l						
1,2-Dichloropr		ug/l						
cis-1,3-Dichlo		ug/l						
Trichloroethen		ug/l	4.00	4.30	5.00 /U	5.00		1.20
Dibromochlorom		ug/l			. • -			
1,1,2-Trichlor		ug/l						
Benzene		ug/l			5.00 /U			
trans-1,3-Dich		ug/l			• • •			
2-Hexanone		ug/l						
Tetrachloroeth		ug/l	1.80	1.90	5.00 /U	10.00		2.50
1,1,2,2-Tetrac		ug/l			• -			
Toluene		ug/l			5.00 /U			
Chlorobenzene		ug/l			• • •			
Ethylbenzene		ug/l						
Styrene		ug/l						
Total Xylenes		ug/l						
No Compounds D		ug/l						
trans-1,2-Dich		ug/l			5.00 /U	8.00	4.00	
cis-1,2-Dichlo		ug/l			,,,	*****		
1.4-Dichlorobe		ug/l	0.30	0.30				0.30
m and p-Xylene		ug/l		J.54				<b></b>
o-Xylena		ug/l						
1,2-Dichlorobe		ug/l						
Fluorotrichlor		ug/l						
2-Chloroethyly		ug/l						

SAMPLE ID: SAMPLE DATE	E:	PP-811 1/03/85	PP-B11-01 4/07/88	PP-B11-02 6/14/88	PP-B11A 12/28/84	PP-B11A 1/03/85	PP-B11A-01 4/07/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/i						
Chloroethane	ug/l						3.00
Methylene Chloride	ug/l						4.36
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	1.00			2.80	3.00	1.95
Total 1,2-Dichloroethene	ug/l	2.10			23.00	31.00	
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l	0.20	0.38		1.30	1.80	1.38
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l	1.00			1.60	1.90	3.00
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	2.00	1.06	0.76	2.70	3.20	
1,1,2,2-Tetrachloroethane							5.68
Toluene	ug/l					0.50	
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l		0.59				11.10
1,4-Dichlorobenzene	ug/l	0.30	• •			0.30	
m and p-Xylene	ug/l				1.70	~. <b>~</b>	
o-Xylene	ug/l				2.50		
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l				0.20	0.30	
2-Chloroethylvinyl ether	ug/l				4.24	7.50	

SAMPLE ID: Sample date:		PP-811A-02 6/14/88	PP-B11A-91 4/07/88	PP-B12 10/25/82	PP-B12 9/06/83	PP-B12 5/01/84	PP-B12 12/29/84
COMPOUNDS	UNIT						
Chloromethane	ug/l					4/0.00	65.00
Vinyl Chloride	ug/l			22.00		160.00	0.70
Chloroethane	ug/l	1.50 J/	2.90	7.00	44.00		2.20
Methylene Chloride	ug/l		4.93	7.00	16.00		2.20
Acetone	ug/l			1200.00			0.70
1,1-Dichloroethene	ug/l	2.00.14	2 (0	83.00	63.00	42.00	76.00
1,1-Dichloroethane	ug/l	2.00 J/	2.40	83.00	63.00	42.00	930.00
Total 1,2-Dichloroethene							730.00
Chloroform	ug/l			6.00			4.10
1,2-Dichloroethane	ug/l	0.70.17	1.37	8.00			0.40
1,1,1-Trichloroethane	ug/L	0.70 J/	1.31				0.40
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l			16.00	22.00	6.00	17.00
1,2-Dichloropropane	ug/l			18.00	22.00	0.00	11.00
cis-1,3-Dichloropropene	ug/l	2.60 J/	2.99	140.00	78.00	30.00	59.00
Trichloroethene	ug/l	2.50 3/	2.77	140.00	70.00	30.00	37100
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l			19.00	10.00		2.60
Benzene	ug/l			19.00	10.00		2.00
trans-1,3-Dichloropropen							
2-Hexanone	ug/l	5 40 14		57.00	49.00	23.00	29.00
Tetrachloroethene	ug/l	5.60 J/	5.49	57.00	49.00	23.00	27.00
1,1,2,2-Tetrachloroethan			3.49				
Toluene Chlorobenzene	ug/l						0.90
Ethylbenzene	ug/l ug/l						0.70
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/t						
trans-1,2-Dichloroethene				400.00	420.00	250.00	
cis-1,2-Dichloroethene	ug/t ug/t	8.20 J/	10.00	400.00	420.00	230.00	
1.4-Dichlorobenzene	ug/l	0.20 4/	10.00				5.70
m and p-Xylene	ug/l						5.00
o-Xylene	ug/l						5.00
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether							

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL GW VOLATILES
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE ID: SAMPLE DATE:		PP-B12 1/04/85	PP-812-01 4/06/88	PP-B12-02 6/14/88	PP-B13 10/25/82	PP-813 9/06/83	PP-813 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	77.00	28.20 J/	8.70	19.00	66.00	
Chloroethane	ug/l	0.60	11.00 J/	7.00			
Methylene Chloride	ug/l	1.90			5.00 /U	17.00	
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.90					
1.1-Dichloroethane	ug/l	83.00	12.70 J/	13.00	32.00	52.00	24.00
Total 1.2-Dichloroethene	ug/l	1020.00					
Chloroform	ug/l						
1.2-Dichloroethane	ug/l	4.10	1.87 J/	1.80	5.00 /U		
1,1,1-Trichloroethane	ug/l	0.30			5.00 /0	11.00	2.60
Carbon Tetrachloride	ug/l				·		
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	17.00	9.89 J/	11.00	7.00	12.00	
cis-1,3-Dichloropropene	ug/l	****					
Trichloroethene	ug/l	59.00	7.30 J/	7.60	94.00	140.00	42.00
Dibromochioromethane	ug/l		•				
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l	4.30	1.97 J/	0.67	8.90	20.00	
trans-1,3-Dichloropropene	ug/l		0.44 J/				
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	29.00	5.56 J/	6.60	42.00	82.00	25.00
1,1,2,2-Tetrachloroethane	ug/l	••••		••••			
Toluene	ug/l						
Chlorobenzene	ug/l	1.70	3.79 J/	4.80			
Ethylbenzene	ug/l		2017 0,	3.30			
Styrene	ug/l			3.20			
Total Xylenes	ug/l						
No Compounds Detected	ug/i						
trans-1,2-Dichloroethene	ug/l		2.75 J/	2.90		320.00	130.00
cis-1,2-Dichloroethene	ug/l		93.60 J/	90.00		520.00	130.00
1,4-Dichlorobenzene	ug/t ug/t	6.20	17.60 J/	22.00			
m and p-Xylene	ug/l	0.20	17.50 37	22.00			
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l		2.35 J/	3.20			
Fluorotrichloromethane	ug/t ug/t		2.33 4/	3.20			
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-813 12/29/84	PP-813 1/04/85	PP-B13-01 4/06/88	PP-813-02 6/14/88	PP-B14 10/25/82	PP-B14 9/06/83
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	47.00	42.00	33.00 J/	12.00 J/		
Chloroethane	ug/l	0.90	0.60	19.00 J/	14.00 J/		
Methylene Chloride	ug/l	1.50	0.90				14.00
Acetone	ug/l					150.00	
1,1-Dichloroethene	ug/l	1.30	1.70	0.22 J/			
1,1-Dichloroethane	ug/l	36.00	32.00	17.00 J/	21.00 J/		
Total 1,2-Dichloroethene	ug/l	610.00	600.00				
Chloroform	ug/l				11.00 J/		
1,2-Dichloroethane	ug/l	1.90	2.00	2.00 J/	3.50 J/		
1,1,1-Trichloroethane	ug/l	7.00	10.00	4.90 J/	3.80 J/		
Carbon Tetrachloride	ug/l				0.42 J/		
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	6.70	6.10	7.10 J/	10.00 J/		
cis-1,3-Dichloropropene	ug/l				•		
Trichloroethene	ug/l	91.00	95.00	30.00 J/	41.00 J/		
Dibromochloromethane	ug/l	,,,,,		2,7,7,7			
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l	3.00	3.20	2.40 J/	2.50		
trans-1,3-Dichloropropene		3.00	3.20	0.48 J/	2.50		
2-Hexanone	ug/l			0.40 0/			
Tetrachloroethene	ug/t ug/t	33.00	48.00	17.00 J/	22.00 J/		
1,1,2,2-Tetrachloroethane		33.00	40.00	17.00 37	22.00 3/		
Toluene	ug/l		0.50	1.60 J/			
Chlorobenzene	ug/l	0.40	0.40	2.40 J/	1.30 J/		
Ethylbenzene	ug/t ug/t	0.70	0.40	2.40 0/	2.10		
Styrene	ug/l				2.10		
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l			2.30 J/	3.10 J/		
cis-1,2-Dichloroethene	ug/l			160.00 1/	190.00 1/		
1,4-Dichlorobenzene	ug/l	1.60	1.50	7.60 J/	11.00 J/		
m and p-Xylene	ug/l	1.00	1.30	7.50 3/	11.00 3/		
o-Xylene	ug/l			2.10 4/			
1,2-Dichlorobenzene	ug/l			2.10 4/	0.47 J/		
Fluorotrichloromethane		0.20	0.30		0.47 3/		
	ug/l	0.20					
2-Chloroethylvinyl ether	ug/l		1.50				

SAMPLE ID: SAMPLE DAT		PP-B14 _5/01/84	PP-814 12/27/84	PP-814 1/02/85	PP-B14-01 4/15/88	PP-814-02 6/14/88	PP-B15 10/25/82
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						11.00
Chloroethane	ug/l						10.00 /U
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l						20.00
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						•
1,1,1-Trichloroethane	ug/l						
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						12.00
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l		0.10	0.10			5.00 /U
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						15.00
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						_
Tetrachloroethene	ug/l						5.00 /U
1,1,2,2-Tetrachloroethane	e ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						5.00 /U
Ethylbenzene	ug/l						27.00
Styrene	ug/l						5.00 /U
Total Xylenes	ug/l						
No Compounds Detected	ug/l	0.00			0.00	0.00	
trans-1,2-Dichloroethene	ug/l						18.00
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l		0.60	0.50			
m and p-Xylene	ug/l						
o-Xylene	ug/l						8.00
1,2-Dichlorobenzenc	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DAT	E:	PP-815 9/06/83	PP-B15 5/01/84	PP-815-01 4/08/88	PP-815-02 6/20/88	PP-B15P-01 4/05/88	PP-815P-02 6/20/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l				3.00 J/		
Chloroethane	ug/l			7.30	1.50 J/		
Methylene Chloride	ug/l	84.00					
Acetone	ug/l						
1,1-Dichloroethene	ug/l						0.00
1.1-Dichloroethane	ug/l	16.00	6.40	1.94		1.31	0.80
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l			0.23	0.24 J/		
1,1,1-Trichloroethane	ug/l					3.57	2.50
Carbon Tetrachloride	ug/l						0.20
Bromodichloromethane	ug/l				0.24 J/		
1,2-Dichloropropane	ug/t	14.00	6.60	3.14	0.86 J/		
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l			0.58		4.68	4.10
Dibromochloromethane	ug/l				0.24 J/		
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l	16.00	7.90	3.93 1/	5.20		
trans-1,3-Dichloropropene	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l					2.50	1.90
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l			1.62 J/	0.24		
Chlorobenzene	ug/l			2.63	0.59 J/		
Ethylbenzene	ug/l	41.00	11.00	2.84 J/	2.30		
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l	8.00					
cis-1,2-Dichloroethene	ug/l					10.10	9.20
1,4-Dichlorobenzene	ug/l			13.30 J/	16.00 J/		
m and p-Xylene	ug/l			1.39 J/	1.00		
n-Xylene	ua/L			2.00 J/	1.80		
1,2-Dichlorobenzene	ug/l			2.52 J/	2.70 J/		
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

	SAMPLE ID: Sample date:		PP-B15R-01 4/05/88	PP-815R-02 6/20/88	PP-B16 10/25/82	PP-B16 9/06/83	PP-B16 5/01/84	PP-B16 12/28/84
Viny   Chloride	COMPOUNDS	UNIT						
Chiorethane	Chloromethane	ug/l						
Methylene Chloride	Vinyl Chloride	ug/l	5.00 J/					
Acetone ug/l 300.00  1,1-Dichloroethene ug/l 6.37 J/ 8.90  1,1-Dichloroethene ug/l 6.37 J/ 8.90  Total 1,2-Dichloroethene ug/l 9,1 1,2-Dichloroethene ug/l 1.10 1,2-Dichloroethene ug/l 0.29  Carbon Tetrachloride ug/l 1.30  Carbon Tetrachloroethene ug/l 4.71 J/ 5.70  cis-1,3-Dichloropropane ug/l 4.88 J/ 4.60  Dibromochloromethane ug/l 3.34 J/ 2.80  Dibromochloromethane ug/l 3.34 J/ 2.80  Dibromochloromethane ug/l 3.34 J/ 2.80  Trans-1,3-Dichloropropane ug/l 4.88 J/ 4.60  Dibromochloromethane ug/l 3.34 J/ 2.80  Dibromochloromethane ug/l 3.34 J/ 2.80  Tetrachloroethene ug/l 3.34 J/ 2.80  Tetrachloroethene ug/l 4.88 J/ 4.60  Tetrachloroethene ug/l 5.70  Tetrachloroethene ug/l 5.70  Tetrachloroethene ug/l 5.70  Tetrachloroethene ug/l 6.80  Total Xylenes ug/l 6.37 J/ 9.60  Total Xylenes ug/l 7.50 Chiloroethene ug/l 7.50 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.60 J/ 9.60  Total Xylenes ug/l 1.60 J/ 9.60  Total Xylenes ug/l 1.29 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.29 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.29 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.29 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60  Tetrans-1,2-Dichloroethene ug/l 1.67 J/ 1.20 J/ 9.60	Chloroethane	ug/l	11.00 J/	7.50				
1,1-Dichloroethene	Methylene Chloride	ug/l				4.00		
1,1-p1chloroethane ug/l (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00 (39.00	Acetone	ug/l			300.00			
Total 1,2-Dichloroethene	1,1-Dichloroethene	ug/l						
Chloroform ug/l 1,2-Dichloroethane ug/l 0.29 1.30 1.30 1.30 1.30 1.30 1.30 1.30 1.30	1,1-Dichloroethane	ug/l	6.37 J/	8.90				0.90
Chloroform ug/l 1,2-Dichloroethane ug/l 0.29 1.30 1.30 1.30 1.30 1.30 1.30 1.30 1.30	Total 1.2-Dichloroethene	ug/l	-					39.00
1,2-Dichloroethane		ug/l						
1,1-Trichloroethane	1.2-Dichloroethane			1.10				
Carbon Tetrachloride ug/l  Bromodichloromethane ug/l  1,2-Dichloropropane ug/l  1,2-Dichloropropane ug/l  Trichloroethene ug/l  1,1,2-Trichloroethane ug/l  1,1,2-Trichloroethane ug/l  1,1,2-Trichloropropane  2-Hexanone ug/l  Tetrachloroethene ug/l  1,1,2,2-Tetrachloroethane ug/l  Tetrachloroethene ug/l  Toluene Chlorobenzene ug/l  Styrene ug/l  No Compounds Detected ug/l  No Compounds Detected ug/l  Total Xylenes ug/l  No Compounds Detected ug/l  No Compounds Detected ug/l  11.60 J/ 9.60  1,4-Dichloroethene ug/l  1,4-Dichloroethene ug/l  1,5-Dichloroethene ug/l  1,67 J/  1,2-Dichloroethene ug/l								1.30
Bromodich(oromethane   ug/t   1,2-Dichtoropropane   ug/t   4.71 J/   5.70				****				
1,2-Dichloropropane								
Cis-1,3-Dichloropropene   Ug/L			4 71 J/	5.70				
Trichloroethene ug/l 4.88 J/ 4.60 11.00 Dibromochloromethane ug/l 1,1,2-Trichloroethane ug/l 8.83 J/ 2.80 5.00  trans-1,3-Dichloropropene ug/l 3.34 J/ 2.80 5.00  trans-1,3-Dichloropropene ug/l 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 7.30 J/ 1.60 J/ 7.30 J/ 1.60 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30 J/ 7.30			44	<b>5</b>				
Dibromochloromethane   ug/l			4 88 .17	4 60				1 00
1,1,2-Trichloroethane			4.62 37	4.00				1.00
Benzene       ug/l       3.34 J/       2.80       5.00         trans-1,3-Dichloropropene       ug/l       1.30 J/       1.60       0.60         2-Hexanone       ug/l       1.30 J/       1.60       0.60         1,1,2,2-Tetrachloroethene       ug/l       0.94       0.94         Ethylbenzene       ug/l       0.94       0.94         Ethylbenzene       ug/l       0.94       0.94         Styrene       ug/l       0.83       29.00       34.00       6.80         Cis-1,2-Dichloroethene       ug/l       1.60 J/       9.60       34.00       6.80         cis-1,2-Dichlorobenzene       ug/l       3.75 J/       0.30         m and p-Xylene       ug/l       1.67 J/       0.30         0-Xylene       ug/l       1.67 J/       0.14 J/	· ·							
trans-1,3-Dichloropropene ug/l 2-Hexanone ug/l Tetrachloroethene ug/l 1.30 J/ 1.60 0.60 1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Chlorobenzene ug/l Styrene ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 1.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 1,3-Dichlorobenzene ug/l 0.14 J/			3 34 1/	2 80	5.00			
2-Hexanone ug/l Tetrachloroethene ug/l 1.30 J/ 1.60 0.60 1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Chlorobenzene ug/l Styrene ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80 cis-1,2-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/			3.54 0,	2.00	5.00			
Tetrachloroethene ug/l 1.30 J/ 1.60 0.60  1,1,2,2-Tetrachloroethane ug/l ug/l  Chlorobenzene ug/l  Ethylbenzene ug/l  Styrene ug/l  No Compounds Detected ug/l  trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80  cis-1,2-Dichlorobenzene ug/l 3.75 J/ 9.60  1,4-Dichlorobenzene ug/l 1.29 J/ 0.30  m and p-Xylene ug/l 1.29 J/ 0.50  1,2-Dichlorobenzene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/								
1,1,2,2-Tetrachloroethane ug/l Toluene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1,2-Dichlorobenzene ug/l 1,2-Dichlorobenzene ug/l 0.83 29.00 34.00 6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80  6.80			1 30 4/	1 60				0.40
Toluene ug/l Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 11.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/			1.30 07	1.00				0.60
Chlorobenzene ug/l Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/								
Ethylbenzene ug/l Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80 cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/				n_94				
Styrene ug/l Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80 cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/				0.74				
Total Xylenes ug/l No Compounds Detected ug/l trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80 cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60 1,4-Dichlorobenzene ug/l 3.75 J/ m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/	•							
No Compounds Detected ug/l 1.83 29.00 34.00 6.80 cis-1,2-Dichloroethene ug/l 9.60 34.00 6.80 cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60 9.60 9.60 9.60 9.60 9.60 9.60 9.60								
trans-1,2-Dichloroethene ug/l 0.83 29.00 34.00 6.80  cis-1,2-Dichloroethene ug/l 11.60 J/ 9.60  1,4-Dichlorobenzene ug/l 3.75 J/ 0.30  m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/								
cis-1,2-Dichloroethene       ug/l       11.60 J/       9.60         1,4-Dichlorobenzene       ug/l       3.75 J/       0.30         m and p-Xylene       ug/l       1.29 J/       0.70         o-Xylene       ug/l       1.67 J/       1.20         1,2-Dichlorobenzene       ug/l       0.14 J/       0.14 J/				78.0	20.00	7/ 00	4 80	
1,4-Dichlorobenzene ug/l 3.75 J/ 0.30 m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/			11 60 37		27.00	34.00	0.00	
m and p-Xylene ug/l 1.29 J/ o-Xylene ug/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/				7.00				0.70
o-Xylene ud/l 1.67 J/ 1,2-Dichlorobenzene ug/l 0.14 J/								0.30
1,2-Dichlorobenzene ug/l 0.14 J/								
		_	U. 17 J/					
2-Chloroethylvinyl ether ug/l								

SAMPLE ID: SAMPLE DATE:		PP-B16 1/03/85	PP-B16-01 4/07/88	PP-B16-02 6/14/88	PP-B16A 12/28/84	PP-B16A 1/03/85	PP-B16A-01 4/07/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l	0.20					9.44
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1.1-Dichloroethane	ua/l	2.40	1.10	0.67	0.40	0.50	0.92
Total 1,2-Dichloroethene	ug/l	220.00			35.00	42.00	
Chloroform	ug/l		0.37				
1,2-Dichloroethane	ug/l						
1,1,1-Trichloroethane	ug/l	3.80	2.70	4.70	1.60	2.20	2.02
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
cis-1,3-Dichloropropene	ug/l						
Trichloroethene	ug/l	3.60	2.50	3.10	1.50	0.30	1.77
Dibromochloromethane	ug/l						
1,1,2-Trichloroethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene			0.66				
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	1.20	2.10	2.60	0.90	1.20	
1,1,2,2-Tetrachloroethane			2				1.24
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
Styrene	ug/l						
Total Xylenes	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l		25.30	16.00			31.50
1,4-Dichlorobenzene	ug/l		27.30	15.50			2.130
m and p-Xylene	ug/l						
o-Xyleise	ug/l						
1,2-Dichlorobenzene	ug/l						
Fluorotrichloromethane	ug/l						
2-Chloroethylvinyl ether	ug/l						

SAMPLE ID: SAMPLE DATE	:	PP-B16A-02 6/14/88
COMPOUNDS	UNIT	
Chloromethane	ug/l	
Vinyl Chloride	ug/l	
Chloroethane	ug/l	
Methylene Chloride	ug/l	
Acetone	ug/l	
1,1-Dichloroethene	ug/l	
1,1-Dichloroethane	ug/l	0.96
Total 1,2-Dichloroethene	ug/l	
Chloroform	ug/l	
1,2-Dichloroethane	ug/l	
1,1,1-Trichloroethane	ug/l	4.20
Carbon Tetrachloride	ug/l	
Bromodichloromethane	ug/l	
1,2-Dichloropropane	ug/l	
cis-1,3-Dichloropropene	ug/l	
Trichloroethene	ug/l	2.10
Dibromochloromethane	ug/l	
1,1,2-Trichloroethane	ug/l	
Benzene _	ug/l	
trans-1,3-Dichloropropene	ug/l	
2-Hexanone	ug/l	
Tetrachloroethene	ug/l	1.90
1,1,2,2-Tetrachloroethane	ug/l	
Toluene	ug/l	
Chlorobenzene	ug/l	
Ethylbenzene	ug/l	
Styrene	ug/l	
Total Xylenes	ug/l	
No Compounds Detected	ug/l	
trans-1,2-Dichloroethene	ug/l	
cis-1,2-Dichloroethene	ug/l	34.00
1,4-Dichlorobenzene	ug/l	
m and p-Xylene	ug/l	
o-Xylene	ug/L	
1,2-Dichlorobenzene	ug/l	
Fluorotrichloromethane	ug/l	
2-Chloroethylvinyl ether	ug/l	

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

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SAMPLE ID: SAMPLE DATE	E:	PP-G101 5/01/84	PP-G102 5/01/84	PP-G102 12/27/84	PP-G102 1/02/85	PP-G102-DUP 12/27/84	PP-G102-DUP 1/02/85
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	uq/t	5.60					
Total 1,2-Dichloroethene	ug/l			0.40			
Chloroform	ug/l					0.10	
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	9.00		0.40	0.20	0.20	0.20
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l	6.40		0.30	0.20	0.20	0.20
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachioroethene	ug/l	18.00		0.90	0.30	0.80	0.30
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l		0.00				
trans-1,2-Dichloroethene	ug/l	38.00					
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3 Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
fluorotrichlorgmethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-G107 12/27/84	PP-G107 1/03/85	PP-G107-01 4/06/88	PP-G107-02 6/14/88	PP-G107-91 4/06/88	PP-G108 12/29/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						2.00
Chloroethane	ug/l						
Methylene Chloride	ug/i		4			15.40	0.50
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	0.30	0.20		0.29		5.90
Total 1,2-Dichloroethene	ug/l	9.00	8.20				85.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						0.30
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	0.90	0.90	0.45 J/	1.30	0.24	3.10
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						3.20
Trichloroethene	ug/l			0.27 J/	1.00	0.50	12.00
Dibromochtoromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	1.30	1.40		0.45	0.27	12.00
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l		0.10				0.10
Ethylbenzene	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l					_	
cis-1,2-Dichloroethene	ug/l			1.94 J/	8.70	2.22	
1,4-Dichlorobenzene	ug/l						0.40
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						0.30
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DAT		PP-G108 1/04/85	PP-G108-01 4/07/88	PP-G108-02 6/14/88	PP-G108-92 6/14/88	PP-G108-DUP 12/29/84	PP-G108-DUP 1/04/85
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	1.20	0.98	0.20		2.30	1.50
Chloroethane	ug/i		2.10	1.00	0.85		
Methylene Chloride	ug/l	0.30				0.60	0.20
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.50					
1,1-Dichloroethane	ug/l	5.00	1.75	0.48	1.20	5.90	5.00
Total 1,2-Dichloroethene	ug/l	82.00				84.00	78.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	0.30				0.30	0.30
2-Butanone	ug/l						
1.1.1-Trichloroethane	ug/l	3.50	2.57	0.40	0.81	3.20	3.20
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	2.90	0.75	1.10	0.84	3.20	2.80
Trichloroethene	ug/l	11.00	5.14	3.70	4.30	12.00	10.00
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene							
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	12.00	5.63	5.20	5.90 J/	12.00	11.00
1,1,2,2-Tetrachloroethane							
Toluene	ug/l						
Chlorobenzene	ug/l	0.10				0.10	0.10
Ethylbenzene	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l		15.90	6.90	7.80		
1,4-Dichlorobenzene	ug/l	0.40		0.57	0.63	0.30	0.30
m and p-Xylene	ug/l			•••	3.33	****	
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1.3-Dichtorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l	0.30				0.30	0.30
DATA NOT AVAILABLE	ug/l					0.30	0.30

SAMPLE ID: SAMPLE DATE:		PP-G109 12/29/84	PP-G109 1/04/85	PP-G109-01 4/06/88	PP-G109-02 6/14/88	PP-G109A 12/29/84	PP-G109A 1/04/85
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	22.00	34.00	6.50	3.70	26.00	56.00
Chloroethane	ug/l			3.70	4.70		1.10
Methylene Chloride	ug/l	5.00	1.10	10.50		0.70	9.40
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.50					1.50
1,1-Dichloroethane	ug/l	20.00	18.00	4.96	4.20	15.00	43.00
Total 1,2-Dichloroethene	ug/l	170.00	290.00			300.00	340.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l		0.80			0.40	0.30
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l		0.30			0.10	1.50
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	2.40	6.70	3.67	3.00	5.40	4.90
Trichloroethene	ug/l	64.00	6.60	1.51	1.10	4.70	130.00
Dibromochloromethane	ug/l						
Benzene	ug/l	3.80	5.50			4.60	9.80
trans-1,3-Dichloropropene							
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	12.00	6.90	3.30	3.40	4.60	68.00
1,1,2,2-Tetrachloroethane							
Toluene	ug/l	1.70	2.00				0,60
Chlorobenzene	ug/l	0.10	1.80	0.73	0.52	1.40	0.20
Ethylbenzene	ug/l				0.24		
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l				1.00		
cis-1,2-Dichloroethene	ug/l			12.80	9.40		
1,4-Dichlorobenzene	ug/l	0.30	4.60	7.24	7.00	5.50	0.60
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichtorobenzene	ug/l			0.49	0.48		
1,3-Dichlorobenzene	UÇ.,			- · ·			
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						0.50
DATA NOT AVAILABLE	ug/l						

SAMPLE ID SAMPLE DA	_	PP-G109A-01 4/06/88	PP-G109A-02 6/14/88	PP-G110 12/29/84	PP-G110 1/04/85	PP-G110-01 4/06/88	PP-G110-02 6/14/88
COMPOUNDS	UNIT	•					
Chloromethane	ug/l						
Vinyl Chloride	ug/l	14.40	9.50	140.00	110.00	0.20 NR/E	98.00
Chloroethane	ug/l	16.50	11.00	5.90	4.50	0.20 NR/E	150.00
Methylene Chloride	ug/l	4.62	1	29.00	62.00		
Acetone	ug/l		ı	110.00	210.00		
1,1-Dichtoroethene	ug/l		0.21	0.80	0.80		0.41
1,1-Dichloroethane	ug/l	22.40	18.00	170.00	140.00	42.50 J/	68.00
Total 1,2-Dichloroethene	ug/l			620.00	760.00		
Chloroform	ug/l						
1.2-Dichloroethane	ug/l	0.46		8.50	7.00	4.07 J/	4.10
2-Butanone	ug/l				21.00		
1,1,1-Trichloroethane	ug/l	0.55		1.00	1.90		0.21
Carbon Tetrachloride	ug/l						
Bromodichtoromethane	ug/l						
1,2-Dichloropropane	ug/l	5.12	5.90	30.00	27.00	8.99 J/	9.60
Trichloroethene	ug/l	27.60	30.00	67.00	70.00	8.20 J/	9.60
Dibromochloromethane	ug/l		_				
Benzene	ug/l	2.98 J/	3.30	43.00	33.00	15.10 J/	17.00
trans-1,3-Dichloropropen							
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l		7.60	9.20	20.00	0.72 J/	2.50
1,1,2,2-Tetrachloroethan		18.90		,	20100	· · · · · · · · · · · · · · · · · · ·	2.50
Toluene	ug/l			55.00	16.00	2.15 J/	3.00
Chlorobenzene	ug/l	1.82 J/		3,50	3.40	2.54 J/	2.50
Ethylbenzene	ug/l		1.20	4.90	18.00	4.07 J/	1.30
No Compounds Detected	ug/l		11.20	4.70	10.00	4.07 37	1.50
trans-1,2-Dichloroethene	ug/l	3.75	4.00			3.81 J/	6.50
cis-1,2-Dichloroethene	ug/l	53.20 J/	64.00			10.30 J/	10.00
1.4-Dichlorobenzene	ug/l	3.98 J/	4.20	11.00	10.00	10.30 3/	9.90
m and p-Xylene	ug/l	3.70 07	4.20	11.00	29.00	2.35 J/	4.40
o-Xvlene	ug/l	1.68 J/		9.10	30.00	3.03 1/	6.10
1,2-Dichlorobenzene	ug/l	0.23 J/	0.30	7.10	30.00	0.66 J/	1.40
1,3-Dichlorobenzene	ug, t	V.LJ 1/	0.30			0.00 1/	
Tetrahydrofuran	ug/l				90.00		0.44
Fluorotrichloromethane	ug/l			1.00	1.00		
DATA NOT AVAILABLE	ug/l			1.00	1.00		

SAMPLE ID: SAMPLE DA		PP-G111 12/27/84	PP-G111 1/02/85	PP-G111-02 6/15/88	PP-G112-01 4/06/88	PP-G112-02 6/14/88	PP-G113-01 4/06/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						7.60
Vinyl Chloride	ug/l				0.40 J/		3.50 J/
Chloroethane	ug/l				0.80 J/		3.10 J/ 20.00 J/
Methylene Chloride	ug/l						20.00 1/
Acetone	ug/l		4 70				
1,1-Dichloroethene	ug/l	1.00	1.30	6.80			0.93 1/
1,1-Dichloroethane	ug/l	9.80	12.00	6.80			0.73 1/
Total 1,2-Dichloroethene	ug/l	190.00	220.00				
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l	4/ 00	19.00	8.70			
1,1,1-Trichloroethane	ug/l	16.00	19.00	6.70			
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						1.47 3/
1,2-Dichloropropane	ug/l	44 00	13.00	6.60			2.30 J/
Trichloroethene	ug/l	11.00	13.00	0.60			2.30 3/
Dibromochloromethane	ug/l						1.88 J/
Benzene	ug/l						1.00 37
trans-1,3-Dichloropropen Bromoform	e ug/l ug/l						
2-Hexanone	ug/l ug/l						
Tetrachloroethene	ug/l	15.00	18.00	9.50	0.65 J/	1.00	4.80 J/
1,1,2,2-Tetrachloroethan		13.00	10.00	7.50	0.03 47	1100	4.00 0,
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene							0.97 J/
cis-1,2-Dichloroethene	ug/l			41.00			22.80 J/
1,4-Dichlorobenzene	ug/l			*****			1.09 J/
m and p-Xylene	ug/l						
o-Xylene	ug/t						1.71 J/
1.2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DAT	E:	PP-G113-02 6/14/88	PP-G113A-01 4/06/88	PP-G113A-02 6/14/88	PP-G114-01 4/06/88	PP-G114-02 6/14/88	PP-G115-01 4/05/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	2.40 J/	0.00 NR/	13.00	8.60 J/	5.80	16.00
Chloroethane	ug/l	1.80 J/	0.00 NR/	92.00	11.00 J/	9.00	19.00
Methylene Chloride	ug/l						19.10
Acetone	ug/l						
1,1-Dichloroethene	ug/l		0.53 J/	1.40			
1 1-Dichloroethane	ug/l	2.50 J/	43.80 J/	110.00	8.33 J/	12.00	2.75
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l		1.85 J/	1.90	1.37 J/	1.80	
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l		3.16 J/	2.20			
Carbon Tetrachloride	ug/l					0.33	
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	0.77 J/	8.41 J/	7.80	7.90 J/	11.00	0.51
Trichloroethene	ug/l	1.10 J/	80.30 J/	160.00	1.06 J/	0.85	
Dibromochloromethane	ug/l		0.41 J/		0.44 J/		
Benzene	ug/l	0.96	4.69 J/	4.50	3.70 J/	3.50	2.80 J/
trans-1,3-Dichloropropene	ug/l		1.49 J/	2.80		0.63	
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	5.30 J/	36.10 J/	75.00			
1,1,2,2-Tetrachloroethane							
Toluene	ug/l				1.78 J/	0.37	
Chlorobenzene	ug/l		2.23 J/	1.20	6.10 J/	8.30	
Ethylbenzene	ug/l	0.38		1.00	2.09 J/		2.13 J/
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l	0.23 J/	4.99 J/	4.60	2.42 J/	3.40	
cis-1,2-Dichloroethene	ug/l	15.00 J/	188.00 J/	280.00	2.67 J/	1.50	5.36
1,4-Dichlorobenzene	ug/l	1.40 J/	5.87 J/	5.50	44.50 J/	63.00	4.50 J/
m and p-Xylene	ug/l				1.51 J/	2.40	
o-Xylene	ug/l	0.45	1.95 J/		2.31 J/	0.71	
1,2-Dichlorobenzene	ug/l			0.36	4.72 1/	7.40	
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
<b>Fluorotrichloromethane</b>	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: Sample date	i <b>:</b>	PP-G115-02 6/14/88	PP-G116-01 4/04/88	PP-G116-02 6/20/88	PP-G116A-01 4/04/88	PP-G116A-02 6/20/88	PP-G116A-91 4/04/88
COMPOUNDS	<u> 11NU</u>						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	16.00					
Chloroethane	ug/l	30.00			1.36	0.53	
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.39					
1,1-Dichloroethane	ug/l	2.60			1.90	3.50	
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l				3.71	4.90	4.28
Carbon Tetrachloride	ug/l	8.00					
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	0.67					
Trichloroethene	ug/l				2.50	4.10	2.73
Dibromochloromethane	ug/l						
Benzene	ug/l	0.51					
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l					5.40	
1,1,2,2-Tetrachloroethane	ug/l				4.52		4.95
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l	0.28					
No Compounds Detected	ug/l		0.00	0.00			
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l	6.60			9.84	18.00	11.50
1,4-Dichlorobenzene	ug/l	3.10					
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	:	PP-G116A-92 6/20/88	PP-G117-01 4/04/88	PP-G117-02 6/20/88	PP-G118A-01 4/05/88	PP-G118A-02 6/20/88	PP-G118R-02 6/20/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l	0.53					
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	3.60					
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	4.80					
Carbon Tetrachloride	ug/l			2.10 J/			
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l	4.20					
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	5.50					
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l		0.00			0.00	0.00
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l	18.00			0.20 J/		
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: Sample date	i:	PP-G119-01 4/04/88	PP-G119-02 6/20/88	PP-G119A-01 4/04/88	PP-G119A-02 6/20/88	PP-GWST1-50 8/17/88	PP-GWST1-51 8/10/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						9.00 /B
Acetone	ug/l						21.00 /B
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						2.00 /JB
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l			0.36	0.37		
Carbon Tetrachioride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l			0.65	0.47		
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						5.00 /B
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l	0.00	0.00				
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l			1.60	1.10		
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l					0.00	

SAMPLE II SAMPLE D		PP-MW101 5/01/84	PP-MW102 5/01/84	PP-MW103 5/01/84	PP-MW104 5/01/84	PP-MW104 12/27/84	PP-MW104 1/02/85
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						
Acetone	ug/l					2.42	4 00
1,1-Dichloroethene	ug/l					0.60	1.00
1.1-Dichloroethane	ug/l				9.50	6.70	8.30
Total 1,2-Dichloroethen						92.00	110.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l					0.30	0.30
2-Butanone	ug/l						45.00
1,1,1-Trichloroethane	ug/l			3.70		12.00	15.00
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l				4.30	6.70	14.00
Dibromochioromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloroprope	ne ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l					8.50	11.00
1,1,2,2-Tetrachloroethe	ne ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l	0.00					
trans-1,2-Dichloroether	e ug/l		7.80		38.00		
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	i:	PP-MW105 5/01/84	PP-MW105-01 4/07/88	PP-MW105-02 6/15/88	PP-MJ105-92 6/15/88	PP-Mi106 5/01/84	PP-MW106 12/27/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						5.60
Chloroethane	ug/l						0.80
Methylene Chloride	ug/l		14.90 R/				0.30
Acetone	ug/l						
1,1-Dichloroethene	ug/l						0.60
1,1-Dichloroethane	ug/l					8.70	7.60
Total 1,2-Dichloroethene	ug/l						42.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						1.90
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l		1.29 J/	1.50	1.40		4.30
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						2.60
Trichloroethene	ug/l		0.37 J/			8.30	7.00
Dibromochloromethane	ug/l						
Benzene	ug/l						1.90
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						2.40
1,1,2,2-Tetrachloroethane							
Toluene	ug/l						
Chlorobenzene	ug/l						0.40
Ethylbenzene	ug/l						
No Compounds Detected	ug/l	0.00					
trans-1,2-Dichloroethene	ug/l					25.00	
cis-1,2-Dichloroethene	ug/l		0.72 J/	0.37	0.34		
1,4-Dichlorobenzene	ug/l						1.20
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ua/l						420.00
Tetrahydrofuran Fluorotrichloromethane	ug/l						120.00
DATA NOT AVAILABLE	ug/l						
NATA MUL AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	E:	PP-MW106-01 4/04/88	PP-MW106-02 6/20/88	PP-MW107 5/01/84	PP-MU107 1/02/85	PP-P1 5/01/84	PP-P1 12/27/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l	5.20	3.10 J/				
Chloroethane	ug/l	6.80	5.40 J/				3.00
Methylene Chloride	ug/l						0.90
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l	2.40	6.00 J/		0.40	9.90	9.40
Total 1,2-Dichloroethene	ug/l				15.00		1.10
Chloroform	ug/l						
1,2-Dichloroethane	ug/l		0.48 J/		0.30		1.50
2-Butanone	ug/l						
1,1,1-Trichtoroethane	ug/l	0.65	3.10 J/		2.50		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	2.10	3.00 J/				2.20
Trichloroethene	ug/l	5.20	6.70 J/		4.30		0.30
Dibromochloromethane	ug/l	2					****
Benzene	ug/l	2.60 J/	2.30				
trans-1,3-Dichloropropene		•					
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l		0.76 J/		1.70		
1,1,2,2-Tetrachloroethane			· · · · · · · · · · · · · · · · · · ·		****		
Toluene	ug/l						
Chlorobenzene	ug/l		0.60 J/				
Ethylbenzene	ug/l		0.79				
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l		0.63 J/	5.60		9.20	
cis-1,2-Dichloroethene	ug/l	8.50	10.00 J/			,	
1,4-Dichlorobenzene	ug/l	7.30 J/	7.10 J/				0.80
m and p-Xylene	ug/l	1.20 J/					
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l	0.48 J/	0.55 J/				
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						130.00
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID SAMPLE DA		PP-P1 1/02/85	4/04/68	pp-p1-0?	PP-P3 5/01/84	PP-P3 12/28/84	PP-P3 1/03/85
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l		6.00	4.40 J/			0.90
Chloroethane	ug/l	3.10	6.00	5.40 1/			
Methylene Chloride	ug/l	0.50					
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1.1-Dichloroethane	ug/l	7.10	6.90	7.10 J/	11.00	12.00	11.00
Total 1,2-Dichloroethene	ug/l	1.10				71.00	82.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	1.30	0.53	0.52 J/		0.60	0.50
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l				7.90	4.10	4.60
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	1.90	3.10	2.50 J/		0.70	3.90
Trichloroethene	ug/l	0.30	0.44	3.60 J/	5.40	6.90	4.90
Dibromochloromethane	ug/l						
Benzene	ug/l		2.08 J/	0.93		0.20	0.30
trans-1,3-Dichloropropen	e ug/l						
Bromoform	ug/l		0.49				
2-Hexanone	ug/l						
Tetrachloroethene	ug/l					5.20	4.80
1,1,2,2-Tetrachlorgethan	e ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l		1.30 J/			0.70	
Ethylbenzene	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene				0.56 J/	28.00		
cis-1,2-Dichloroethene	ug/l		5.60	13.00 J/			
1,4-Dichlorobenzene	ug/l	0.80	5.20 J/	0.93 J/		0.20	
m and p-Xylene	ug/l	• • • • • • • • • • • • • • • • • • • •	2,20 0,	3,,,			
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l		1.00 J/				
1,3-Dichterobenzene	<b>ug/</b> (						
Tetrahydrofuran	ug/l	57.00					
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	:	PP-P3-DUP 12/28/84	PP-P3-DUP 1/03/85	PP-P3R-01 4/05/88	PP-P3R-02 6/20/88	PP-P4 5/01/84	PP-P4 12/28/84
COMPOUNDS	UNIT						
Chloromethane	ug/l			4.00			
Vinyl Chloride	ug/l		1.50	4.00	1.90		
Chloroethane	ug/l				1.90		
Methylene Chloride	ug/l			18.80			
Acetone	ug/l						
1,1-Dichloroethene	ug/l						0.90
1,1-Dichloroethane	ug/l	10.00	10.00	10.70	10.00	11.00	9.40
Total 1,2-Dichloroethene	ug/l	66.00	81.00				150.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	0.50	0.50	0.38	0.38		0.40
2-Butanone	ug/l			-			
1,1,1-Trichloroethane	ug/l	3.70	4.60		0.47	10.00	12.00
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	2.20	1.20	1.19	1.10		4.50
Trichloroethene	ug/l	5.00	6.70	2.55	1.60	8.50	10.00
Dibromochloromethane	ug/l						
Benzene	ug/l		0.30	1.46 J/	0.68		
trans-1,3-Dichioropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	3.70	5.10			12.00	12.00
1,1,2,2-Tetrachloroethane		****					
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l				0.75		
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l				0.34	48.00	
cis-1,2-Dichloroethene	ug/l			9.69	8.30		
1,4-Dichlorobenzene	ug/l				1.40		
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL GW VOLATILES
ANALYSIS TYPE: Volatiles MATRIX: Ground Water

SAMPLE SAMPLE		PP-P4 1/03/85	PP-P4R-01 4/05/88	PP-P4R-02 6/20/88	PP-P4R-91 4/05/88	PP-P5 5/01/84	PP-P5 12/28/84
COMPOUNDS	UNIT						
Chioromethane	ug/l		4.00		4.00		
Vinyl Chloride	ug/l		2.00	0.95	2.00	_	
Chloroethane	ug/l			2.70		•	
Methylene Chloride	ug/l				15.00		
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.90	0.33		0.22		0.80
1.1-Dichloroethane	ug/l	9.90	6.80	6.70	7.00	10.00	7.20
Total 1,2-Dichloroethe		150.00					130.00
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	0.40	0.43	0.45	0.39		0.30
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	14.00	7.90	6.80	7.70	13.00	12.00
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	3.00	0.78	0.47	0.72		
Trichloroethene	ug/l	12.00	7.90	7.40	7.90	7.80	9.40
Dibromochloromethane	ug/l						
Benzene	ug/l		1.40 J/	0.83	1.40 J/		
trans-1,3-Dichloroprop	ene ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	13.00	8.70	7.40	8.10	13.00	11.00
1,1,2,2-Tetrachloroeti	nané ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l			0.34			
Ethylbenzene	ug/l			0.44			
No Compounds Detected	ug/l						
trans-1,2-Dichloroeth	ene ug/l			0.32		56.00	
cis-1,2-Dichloroethen	e ug/l		35.00	31.00	39.00		
1,4-Dichlorobenzene	ug/l		1.00 J/	1.40	0.97 J/		
m and p-Xylene	ug/i						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethan							
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DAT		PP-P5 1/03/85	PP-P6 5/01/84	PP-P6 12/29/84	PP-P6 1/04/85	PP-P6-01 4/06/88	PP-P6-02 6/14/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l	0.60		2.10	4.40	2.10	3.50
1,1-Dichloroethane	ug/l	6.70		3.80	5.90	4.80	10.00
Total 1,2-Dichloroethene	ug/l	120.00		110.00	150.00		
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	0.30		0.30	0.80	0.39	1.50
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	11.00		17.00	28.00	12.60	33.00
Carbon Tetrachloride	ug/l					0.23	1.00
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l	5.90					
Trichloroethene	ug/l	6.70		22.00	30.00	14.90	36.00
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	9.90		8.30	14.00	10.00	31.00
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l		0.00				
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l					62.20	93.00 J/
1,4-Dichlorobenzene	ug/l			0.60	0.60		
m and p-Xylene	ug/l						
o-Xylene	ug/l	0.50					
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-P6-92 6/14/88	PP-P7 5/01/84	PP-P7 12/27/84	PP-P7 1/03/85	PP-P7-01 4/05/88	PP-P7-02 6/20/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l					1.40	
Methylene Chloride	ug/l						
Acetone	ug/l						
1,1-Dichloroethene	ug/l	3.10					
1,1-Dichloroethane	ug/l	10.00			•		
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l	1.50					
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	37.00		3.20	4.30	1.64	1.30 J/
Carbon Tetrachloride	ug/l	1.20					•
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l	36.00		0.10	0.10		
Dibromochloromethane	ug/l						
Benzene	ug/l						
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	31.00		0.20	0.30		0.27 J/
1,1,2,2-Tetrachloroethane	ug/l						_
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l		0.00				
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l	78.00				0.58	
1,4-Dichlorobenzene	ug/l			0.80	0.80		
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1.3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE 1D: SAMPLE DATE	i:	PP-PW1-01 4/08/88	PP-PW1-91 4/08/88	PP-PWA 5/01/84	PP-PM8 5/01/84	PP-PWC 5/01/84	PP-PMD 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l						
cetone	ug/l						
,1-Dichloroethene	ug/l						
,1-Dichloroethane	ug/l						
otal 1,2-Dichloroethene	ug/l						
hloroform	ug/l						
,2-Dichloroethane	ug/l						
-Butanone	ug/l						
,1,1-Trichloroethane	ug/i						
arbon Tetrachloride	ug/l						
romodichloromethane	ug/l		0.21 J/				
,2-Dichloropropane	ug/l						
richloroethene	ug/l						
ibromochloromethane	ug/l						
enzene	ug/i						
rans-1,3-Dichloropropene	ug/l						
romoform	ug/l						
-Hexanone	ug/l			•			
etrachloroethene	ug/l						
,1,2,2-Tetrachloroethane							
oluene	ug/l						
th Lorobenzene	ug/l						
thylbenzene	ug/l						
lo Compounds Detected	ug/l	0.00		0.00	0.00	0.00	0.0
rans-1,2-Dichloroethene	ug/l						
is-1,2-Dichloroethene	ug/l						
,4-Dichlorobenzene	ug/l						
n and p-Xylene	ug/l						
o-Xylene	ug/i						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l						
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-PWE 9/06/83	PP-PWE 5/01/84	PP-PWE-DUP 9/06/83	PP-PWF 5/01/84	PP-PWG 10/25/82	PP-PWG 9/06/83
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l					21.00	57.00
Chloroethane	ug/l						
Methylene Chloride	ug/l			5.00		55.00	9.00
Acetone	ug/l						
1,1-Dichloroethene	ug/l	2.00					40.00
1,1-Dichloroethane	ug/l		1.60		5.80	22.00	12.00
Total 1,2-Dichloroethene	ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	17.00	3.30	15.00	6.40		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l				1.70		
Trichloroethene	ug/l	32.00	7.40	30.00	10.00	57.00	26.00
Dibromochloromethane	ug/l						
Benzene	ug/l					7.40	6.00
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l	15.00		13.00	6.70	51.00	33.00
1,1,2,2-Tetrachloroethane							
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l	130.00	57.00	130.00	45.00	73.00	59.00
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l					F 65	
Fluorotrichloromethane	ug/l					5.00 /U	
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	: <b>:</b>	PP-PWG 5/01/84	PP-PWG 12/28/84	PP-PWG 1/04/85	PP-PWN 10/25/82	PP-PWH 9/06/83	PP-PWH 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l		38.00	43.00			
Chloroethane	ug/l					7 00	
Methylene Chloride	ug/l		1.30	1.60		7.00	
Acetone	ug/l					7.00	
1,1-Dichloroethene	ug/l				44.44	3.00	
1,1-Dichloroethane	ug/l	5.90	11.00	11.00	16.00	13.00	
Total 1,2-Dichloroethene	ug/l		110.00	110.00			
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l				47.00	13.00	
1,1,1-Trichloroethane	ug/l		0.90	0.80	13.00	15.00	
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l		2.00	1.90	13.00	18.00	
Trichloroethene	ug/l	8.00	22.00	20.00	13.00	18.00	
Dibromochloromethane	ug/l		~ 44	7.00			
Benzene	ug/l		3.10	3.00			
trans-1,3-Dichloropropene							
Bromoform	ug/l						
2-Hexanone	ug/l			20.00	11.00	14.00	
Tetrachloroethene	ug/l	10.00	21.00	20.00	11.00	14.00	
1,1,2,2-Tetrachloroethane				7 70			
Toluene	ug/l		1.00	3.70			
Chlorobenzene	ug/l		0.40	0.40			
Ethylbenzene	ug/l						0.00
No Compounds Detected	ug/l	~ ~			210.00	180.00	0.00
trans-1,2-Dichloroethene	ug/l	30.00			210.00	180.00	
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l		0.80	0.80			
m and p-Xylene	ug/l			• /^			
o-Xylene	ug/l			1.40			
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l		A 50	0.50			
Fluorotrichloromethane	ug/l		0.50	0.50			
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE:		PP-PWH PP-PWI PP-PWI 12/29/84 1/02/85 10/25/82			PP-PWI 9/06/83	PP-PWJ 5/01/84	PP-PWK 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l			40.00	85.00		
Chloroethane	ug/l						
Methylene Chloride	ug/l			10.00	11.00		
Acetone	ug/l						
1,1-Dichloroethene	ug/l	3.70	3.90				
1,1-Dichloroethane	11g/L	19.00	19.00	46.00	29.00		
Total 1,2-Dichloroethene	ug/l	540.00	550.00				
Chloroform	ug/i						
1,2-Dichloroethane	ug/l	1.00	1.00				
2-Butanone	ug/l						
1,1,1-Trichloroethane	ug/l	16.00	16.00	9.10	5.00		
Carbon Tetrachloride	ug/l						
Bromodichloromethane	ug/l						
1,2-Dichloropropane	ug/l			5.00 /U	9.00		
Trichloroethene	ug/l	14.00	15.00	100.00	85.00		
Dibromochloromethane	ug/l						
Benzene	ug/l			12.00	12.00		
trans-1,3-Dichloropropene	ug/l						
Bromoform	ug/l						
2-Hexanone	ug/l			100.00 /U			
Tetrachloroethene	ug/l	13.00	13.00	49.00	49.00		
1,1,2,2-Tetrachloroethane	ug/l						
Toluene	ug/l			44.00	15.00		
Chlorobenzene	ug/l						
Ethylbenzene	ug/l			5.30			
No Compounds Detected	ug/l					0.00	0.00
trans-1,2-Dichloroethene	ug/l			230.00	220,00		
cis-1,2-Dichloroethene	ug/l						
1,4-Dichlorobenzene	ug/l						
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene	ug/l						
1,3-Dichlorobenzene	ug/l						
Tetrahydrofuran	ug/l						
Fluorotrichloromethane	ug/l			5.00 /u			
DATA NOT AVAILABLE	ug/l						

	LE ID: LE DATE:	PP-PWL 10/25/82	PP-PWL 9/06/83	PP-PWL 5/01/84	PP-PUN 10/25/82	PP-PUM 5/01/84	PP-PUN 5/01/84
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l		3.00				
Acetone	ug/l						
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l						
Total 1,2-Dichloroet	thene ug/l						
Chloroform	ug/l						
1,2-Dichloroethane	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroethan	ne ug/l		4.00		5.00 /U		
Carbon Tetrachloride	e ug/l						
Bromodichloromethan	e ug/l						
1,2-Dichloropropane	ug/l						
Trichloroethene	ug/l		1.00				
Dibromochloromethan	e ug/l						
Benzene	ug/l						
trans-1,3-Dichlorope							
Bromoform	ug/l						
2-Hexanone	ug/l						
Tetrachloroethene	ug/l		4,00		5.00		
1,1,2,2-Tetrachioro					-1		
Toluene	ug/l						
Chlorobenzene	ug/l						
Ethylbenzene	ug/l						
No Compounds Detect		0.00		0.00		0.00	0.0
trans-1,2-Dichloroe		<b>7.00</b>	6.00	•	5.00 /U	0.00	•••
cis-1,2-Dichloroeth			0.00		3.00 70		
1.4-Dichlorobenzene							
m and p-Xylene	ug/l						
o-Xylene	ug/l						
1,2-Dichlorobenzene							
1,3-Dichlorobenzene							
Tetrahydrofuran	ug/l						
Fluorotrichlorometh							
DATA NOT AVAILABLE	ug/l						

SAMPLE ID: SAMPLE DATE	:	PP-PW0 5/01/84	PP-PWO-02 6/15/88	SCALE HOUSE 10/25/82
COMPOUNDS	UNIT			
Chloromethane	ug/l			
Vinyl Chloride	ug/l			
Chloroethane	ug/l			
Methylene Chloride	ug/l			
Acetone	ug/l			
1,1-Dichloroethene	ug/l			
1,1-Dichloroethane	ug/l			12.00
Total 1,2-Dichloroethene	ug/l			
Chloroform	ug/l			
1,2-Dichloroethane	ug/l			
2-Butanone	ug/l			
1,1,1-Trichloroethane	ug/l			12.00
Carbon Tetrachloride	ug/l			
<b>Bromodichloromethane</b>	ug/l			
1,2-Dichloropropane	ug/l			5.00 /U
Trichloroethene	ug/l			35.00
Dibromochloromethane	ug/l			
Benzene	ug/l			
trans-1,3-Dichloropropene	ug/l			
Bromoform	ug/l			
2-Hexanone	ug/l			
Tetrachloroethene	ug/l			23.00
1,1,2,2-Tetrachloroethane	ug/l			
Toluene	ug/l			
Chlorobenzene	ug/l			
Ethylbenzene	ug/l			
No Compounds Detected	ug/l	0.00	0.00	
trans-1,2-Dichloroethene	ug/l			710.00
cis-1,2-Dichloroethene	ug/l			
1,4-Dichlorobenzene	ug/l			
m and p-Xylene	ug/l			
o-Xylene	ug/l			
1,2-Dichlorobenzene	ug/l			
1,3-Dichlorobenzene	ug/l			
Tetrahydrofuran	ug/l			
Fluorotrichloromethane	ug/l			
DATA NOT AVAILABLE	ug/l			

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

# HISTORICAL GROUNDWATER DATA INDICATORS

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	LE ID: Le date:	#PP4 3/07/80	#PP6 3/07/80	BLACKTOPS HS 3/07/80	PP-804-01 4/05/88	PP-B04-02 6/15/88	PP-806D-01 4/07/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	280.00	252.00	426.00	553.00	565.00	273.00
Chloride	mg/l	21.00	13.00	25.00	9.00	9.00	10.00
Chemical Oxygen Dema	and mg/l	12.00	10.00 /U	10.00 /U			
Phenol	ug/l			•		9.00 J/	
Sulfate	mg∕l	18.00	43.00	47.00			
Nitrate Nitrogen	mg/l	4.00	7.00	11.00			
Field pH	s.u.	7.30	7.40	6.80			
Field Conductivity	umho/cm		640.00	990.00			
Hardness	mg/l	330.00	350.00	540.00			

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-B06D-02 6/15/88	PP-8060-92 6/15/88	PP-806S-01 4/07/88	PP-806S-02 6/15/88	PP-807-01 4/07/88	PP-B07-02 6/15/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	277.00	268.00	287.00	270.00	321.00	302.00
Chloride	mg/l	11.00	10.00	23.00	27.00	23.00	26.00
Chemical Oxygen	Demand mg/l						
Phenol	ug/l	14.00 J/	11.00 J/		16.00 J/		8.00 J/
Sulfate	mg∕l						
Nitrate Nitroger	n mg/l			•			
Field pH	s.u.						
Field Conductivi	ity umho/cm	1					
Hardness	mg∕l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	PLE ID: PLE DATE:	PP-808 12/27/84	PP-808 1/02/85	PP-B09 12/27/84	PP-809 1/02/85	PP-809-01 4/05/88	PP-809-02 6/15/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	462.00	450.00	291.00	291.00	294.00	292.00
Chloride	mg/l	7.00	3.00	9.00	9.00	4.00	6.00
Chemical Oxygen Den	mand mg/l						
Phenol	ug/l	5.00 /U	5.00 /U	5.00 /U	5.00 /U	9.00	14.00 J/
Sulfate	mg/l						
Nitrate Nitrogen	mg∕l			-			
Field pH	s.u.	7.25	7.55	7.10	7.24		
Field Conductivity	umho/cm	770.00	750.00	540.00	600.00		
Hardness	mg/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

SAMPLE Sample (		PP-B10 12/27/84	PP-B10 1/02/85	PP-810-01 4/06/88	PP-810-02 6/14/88	PP-B10A 12/27/84	PP-B10A 1/02/85
COMPOUNDS	UNIT						
Alkalinity	mg/l	383.00	420.00	438.00	424.00	296.00	307.00
Chloride	mg/l	19.00	17.00	15.00	17.00	18.00	17.00
Chemical Oxygen Demand							• • • • • • • • • • • • • • • • • • • •
Phenol	ug/l	5.00 /U	5.00 /U		22.00 J/	5.00 /U	5.00 /U
Sul fate	mg/l					,-	
Nitrate Nitrogen	mg∕l			•			
Field pH	s.u.	7.38	7.26			7.48	7.03
Field Conductivity	umho/cm	780.00	755.00			630.00	655.00
Hardness	mg/l	2 • • •				230.00	222.00

	MPLE ID: MPLE DATE:	PP-811 12/27/84	PP-811 1/02/85	PP-811-01 4/07/88	PP-B11-02 6/14/88	PP-B11A 12/27/84	PP-B11A 1/02/85
COMPOUNDS	<u>Unit</u>						
Alkalinity Chloride Chemical Oxygen D	•	432.00 13.00	435.00 13.00	379.00 5.00	392.00 6.00	413.00 10.00	416.00 12.00
Phenol Sulfate Nitrate Nitrogen	ug/l mg/l mg/l	5.00 /U	5.00 /U		5.00 J/	5.00 /U	5.00 /U
Field pH Field Conductivit Hardness	s.u. y umho/cm mg/l	7.12 910.00	6.88 855.00			7.23 815.00	6.97 780.00

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	MPLE ID: MPLE DATE:	PP-B11A-01 4/07/88	PP-B11A-02 6/14/88	PP-B11A-91 4/07/88	PP-B12 12/27/84	PP-B12 1/02/85	PP-812-01 4/06/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	463.00	476.00	460.00	917.00	923.00	910.00
Chloride	mg/l	9.00	11.00	9.00	25.00	23.00	22.00
Chemical Oxygen D	emand mg/l						
Phenol	ug/l		9.00 J/		5.00 /U	5.00 /U	12.00
Sulfate	mg∕l					,	
Nitrate Nitrogen	mg/l			•			
Field pH	s.u.				6.68	6.70	
Field Conductivity	y umbo/cm				1610.00	1570.00	
Hardness	mg/l						

	PLE ID: PLE DATE:	PP-812-02 6/14/88	PP-B13 12/27/84	PP-B13 1/02/85	PP-B13-01 4/06/88	PP-B13-02 6/14/88	PP-B14 12/27/84
COMPOUNDS	UNIT						
Alkalinity	mg/t	953.00	580.00	528.00	647.00	781.00	224.00
Chloride	mg∕l	25.00	19.00	19.00	28.00	32.00	14.00
Chemical Oxygen De	mand mg/l						
Phenol	ug/l	5.00 J/	5.00 /U	5.00 /U			5.00 /U
Sulfate	mg/t						•
Nitrate Nitrogen	mg/l			-			
Field pH	s.u.		6.82	6.70			7.30
Field Conductivity	umho/ca		1130.00	1050.00			465.00
Hardness	mg/l						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

	LE ID: Le date:	PP-814 1/02/85	PP-B14-01 4/05/88	PP-B14-02 6/14/88	PP-B15 12/27/84	PP-B15 1/02/85	PP-B15-01 4/08/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	220.00	289.00	279.00	2010.00	1990.00	1270.00
Chloride	mg∕l	10.00	10.00	12.00	1220.00	1210.00	609.00
Chemical Oxygen Dem	and mg/l						
Phenol	ug/l	5.00 /U		9.00 J/	38.00	39.00	25.00
Sulfate	mg/l						
Nitrate Nitrogen	mg/l			-			
Field pH	s.u.	7.32			7.07	6.96	
Field Conductivity	umho/cm	500.00			7760.00	7370.00	
Hardness	mg/t						

	MPLE ID: MPLE DATE:	PP-B15-02 6/20/88	PP-B15P-01 4/05/88	PP-B15P-02 6/20/88	PP-B15R 12/27/84	PP-B15R 1/02/85	PP-815R-01 4/05/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	1640.00	297.00	283.00	1420.00	1470.00	1130.00
Chloride	mg/l	860.00	14.00	15.00	891.00	885.00	477.00
Chemical Oxygen D	emand mg/l						
Phenol	ug/l	145.00		11.00 J/	11.00	14.00	6.00
Sul fat <b>e</b>	mg/l						
Nitrate Nitrogen	mg/l			•			
Field pH	s.u.				7.00	6.90	
Field Conductivit	y umho/cm	1			5200.00	4950.00	
Hardness	mg/l						

	LE ID: Le date:	PP-815R-02 6/20/88	PP-816 12/27/84	PP-B16 1/02/85	PP-816-01 4/07/88	PP-816-02 6/14/88	PP-B16A 1 <u>2</u> /27/84
COMPOUNDS	UNIT						
Alkalinity	mg/l	1180.00	322.00	349.00	311.00	313.00	250.00
Chloride	mg/l	348.00	29.00	23.00	19.00	17.00	14.00
Chemical Oxygen Demi	and mg/l						
Phenol	ug/l	14.00 J/	5.00 /U	5.00 /U		10.00 J/	5.00 /U
Sul fate	mg∕t					-	-
Nitrate Nitrogen	mg/l			•			
Field pH	s.u.		7.76	7.40			7.39
Field Conductivity	umho/cm		620.00	745.00			545.00
Hardness	mg/l						

	MPLE ID: MPLE DATE:	PP-B16A 1/02/85	PP-B16A-01 4/07/88	PP-B16A-02 6/14/88	PP-G102 12/27/84	PP-G102 1/02/85	PP-G107 12/27/84
COMPOUNDS	UNIT						
Alkalinity	mg/l	282.00	245.00	238.00	325.00	335.00	511.00
Chloride	mg/l	12.00	16.00	18.00	18.00	25.00	19.00
Chemical Oxygen D	emand mg/l						
Phenol	ug/l	5.00 /U		12.00 J/	5.00 /U	5.00 /U	5.00 /U
Sulfate	mg/l						
Nitrate Nitrogen	mg/t			•			
Field pH	s.u.	7.00			7.50	7.55	6.75
Field Conductivit	y umho/cm	575.00			705.00	690.00	940.00
Hardness	mg/l						

	SAMPLE ID: SAMPLE DATE:	PP-G107 1/02/85	PP-G107-01 4/06/88	PP-G107-02 6/14/88	PP-G107-91 4/06/88	PP-G108 12/27/84	PP-G108 1/02/85
COMPOUNDS	UNIT						
Alkalinity	mg/l	516.00	377.00	295.00	364.00	570.00	569.00
Chloride	mg/l	17.00	20.00	16.00	20.00	7.00	9.00
Chemical Oxygen	Demand mg/l						
Phenol	ug/l	5.00 /U	5.00 J/	7.00 J/		5.00 /U	5.00 /U
Sulfate	mg/l						
Nitrate Nitroge	n mg∕l			•			
Field pH	s.u.	6.77				6.86	6.60
Field Conductiv	ity umho/cm	970.00				1060.00	1060.00
Hardness	mg/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE 1D: SAMPLE DATE:	PP-G108-01 4/07/88	PP-G108-02 6/14/88	PP-G108-92 6/14/88	PP-G109 12/27/84	PP-G109 1/02/85	PP-G109-01 4/06/88
COMPOUNDS	UNIT						
Alkalinity	mg/L	609.00	608.00	611.00	704.00	916.00	848.00
Chloride Chemical Oxyge	mg/l en Demand mg/l	9.00	11.00	11.00	19.00	19.00	28.00
Phenol Sulfate	ug/l ng/l ng/l		11.00 J/	8.00 J/	5.00 /U	5.00 /U	
Nitrate Nitro	gen mg/l			•			
Field pH Field Conducti	s.u. ivity umho/cm				6.85 1260.00	6.75 1450.00	
Hardness	mg/l				1200.00	1430.00	

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

SAMPLI Sampli	E ID: E DATE:	PP-G109-02 _6/14/88	PP-G109A 12/27/84	PP-G109A 1/02/85	PP-G109A-01 4/06/88	PP-G109A-02 6/14/88	PP-G110 12/27/84
COMPOUNDS	TINU						
Alkalinity	mg/l	829.00	744.00	893.00	844.00	870.00	721.00
Chloride	mg/l	27.00	25.00	35.00	62.00	60.00	73.00
Chemical Oxygen Demai						23333	
Phenol	ug/l		5.00 /U	5.00 /U		5.00 J/	5.00 /U
Sul fate	mg/l					2130 0,	2.00 / 0
Nitrate Nitrogen	mg/l			-			
Field pH	s.u.		7.35	6.90			6.75
Field Conductivity	umho/cm		1330.00	1450.00			1400.00
Hardness	mg/l						

	LE ID: LE DATE:	PP-G110 1/02/85	PP-G110-01 4/06/88	PP-G110-02 6/14/88	PP-G111 12/27/84	PP-G111 1/02/85	PP-G111-02 6/15/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	773.00	533.00	680.00	267.00	293.00	268.00
Chloride	mg/l	57.00	166.00	234.00	22.00	21.00	22.00
Chemical Oxygen Dem							
Phenol	ug/l	5.00 /U	10.00	170.00	5.00 /U	5.00 /U	8.00 J/
Sulfate	mg/l				•		
Nitrate Nitrogen	mg/l			•			
Field pH	s.u.	6.50			7.45	7.35	
Field Conductivity	umho/cm	1450.00			620.00	665.00	
Hardness	mg/l						

ID: DATE:	PP-G112-01 4/06/88	PP-G112-02 6/14/88	PP-G113-01 4/06/88	PP-G113-02 6/14/88	PP-G113A-01 4/06/88	PP-G113A-02 6/14/88
UNIT						
mg/l mg/l mg/l	569.00 29.00	615.00 34.00	881.00 30.00	840.00 29.00	800.00 30.00	842.00 28.00
ug/l mg/l mg/l s.u.		9.00 J/	9.00 J/	17.00 J/		12.00 J/
	UNIT  mg/l mg/l mg/l mg/l ug/l mg/l mg/l mg/l s.u.	UNIT  mg/l 569.00  mg/l 29.00  mg/l ug/l  mg/l  mg/l  mg/l  mg/l	DATE: 4/06/88 6/14/88  UNIT  mg/l 569.00 615.00  mg/l 29.00 34.00  mg/l  ug/l 9.00 J/  mg/l  mg/l  mg/l  s.u.	DATE: 4/06/88 6/14/88 4/06/88  UNIT  mg/l 569.00 615.00 881.00  mg/l 29.00 34.00 30.00  mg/l  ug/l 9.00 J/ 9.00 J/  mg/l  mg/l s.u.	DATE: 4/06/88 6/14/88 4/06/88 6/14/88  UNIT  mg/l 569.00 615.00 881.00 840.00  mg/l 29.00 34.00 30.00 29.00  mg/l  ug/l 9.00 J/ 9.00 J/ 17.00 J/  mg/l  mg/l  mg/l  s.u.	DATE: 4/06/88 6/14/88 4/06/88 6/14/88 4/06/88  UNIT  mg/l 569.00 615.00 881.00 840.00 800.00  mg/l 29.00 34.00 30.00 29.00 30.00  mg/l 9.00 J/ 9.00 J/ 17.00 J/  mg/l mg/l mg/l s.u.

	SAMPLE ID: SAMPLE DATE:	PP-G114-01 4/06/88	PP-G114-02 6/14/88	PP-G115-01 4/05/88	PP-G115-02 6/14/88	PP-G116-01 4/05/88	PP-G116-02 6/20/88
COMPOUNDS	UNIT						
Alkalinity Chloride Chemical Oxygen	mg/l mg/l Demand mg/l	855.00 42.00	847.00 44.00	816.00 40.00	816.00 48.00	253.00 7.00	292.00 7.00
Phenol Sulfate Nitrate Nitroger Field pH Field Conductivi Hardness	ug/l mg/l n mg/l s.u.	6.00 J/	19.00 J/	-	8.00 J/		14.00 J/

SAMPLE Sample		PP-G116A-01 4/05/88	PP-G116A-02 6/20/88	PP-G116A-91 4/05/88	PP-G116A-92 6/20/88	PP-G117-01 4/05/88	PP-G117-02 6/20/88
COMPOUNDS	UNIT						
Alkalinity Chloride	mg/l mg/l	313.00 41.00	399.00 99.00	303.00 40.00	395.00 101.00	395.00 28.00	387.00 26.00
Chemical Oxygen Deman Phenol		4,100	13.00 J/	40.00	9.00 J/	25.00	7.00 J/
Sulfate Nitrate Nitrogen	mg/l mg/l			•			
Field pH Field Conductivity Hardness	s.u. umho/cm mg/l	1					

SAMPLE SAMPLE		PP-G118A-01 4/05/88	PP-G118A-02 6/20/88	PP-G118R-02 6/20/88	PP-G119-01 4/04/88	PP-G119-02 6/20/88	PP-G119A-01 4/04/88
COMPOUNDS	UNIT						
Alkalinity Chloride Chemical Oxygen Demana	mg/l mg/l d mg/l	273.00 12.00	272.00 14.00	338.00 33.00	282.00 3.00	295.00 8.00	272.00 12.00
Phenol Sulfate Nitrate Nitrogen Field pH Field Conductivity Hardness	ug/l mg/l mg/l s.u. umho/cm	ı	13.00 J/	8.00 J/		11.00 J/	

	SAMPLE ID: SAMPLE DATE:	PP-G119A-02 6/20/88	PP-GWST1-5D 11/12/88	PP-GWST1-51 11/14/88	PP-GWSTI-51-01 8/25/88	PP-GWST1-51-91 8/25/88	PP-M/104 12/27/84
COMPOUNDS	UNIT						
Alkalinity Chloride	mg/l mg/l	270.00 13.00					282.00 23.00
Chemical Oxygen Phenol	Demand mg/t ug/t	8.00 J/	19.00 U/B	22.00 U/B	7.00 J/	13.00 J/	5.00 /u
Sulfate Nitrate Nitroge	•			•			7.75
Field pH Field Conductiv Hardness	s.u. vity umho/cm mg/l	١					7.35 590.00

	SAMPLE ID: SAMPLE DATE:	PP-MW104 1/02/85	PP-MW105-01 4/07/88	PP-MW105-02 6/15/88	PP-MV105-92 6/15/88	PP-MW106 12/27/84	PP-MW106 1/02/85
COMPOUNDS	UNIT						
Alkalinity	mg/l	267.00	260.00	258.00	257.00	661.00	641.00
Chloride	mg/l	21.00	17.00	19.00	19.00	253.00	239.00
Chemical Oxyger		<b>5 44</b>		44 44	4= 00		
Phenol	ug/l	5.00 /U		11.00 J/	18.00 J/	5.00 /U	6.00
Sulfate	mg/L			•			
Nitrate Nitroge	en mg/l						
Field pH	s.u.	7.51				7.00	7.07
Field Conductiv	rity um/ho/cm.	665.00				1910.00	1910.00
Hardness	mg/l						

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL DATA SUMMARY
ANALYSIS TYPE: GW Indicators MATRIX: Ground Water

	SAMPLE ID: SAMPLE DATE:	PP-MW106-01 4/05/88	PP-MV106-02 6/20/88	PP-MW107 12/27/84	PP-MW107 1/02/85	PP-P1 12/27/84	PP-P1 1/02/85
COMPOUNDS	UNIT						
Alkalinity	mg/l	1030.00	949.00	281.00	271.00	567.00	566.00
Chloride	mg/l	430.00	378.00	5.00	5.00	168.00	191.00
Chemical Oxygen	Demand mg/l						
Phenol	ug/l	8.00	12.00 J/	5.00 /U	5.00 /U	53.00	62.00
Sul fate	mg/l						
Nitrate Nitroge	n mg/l			•			
Field pH	s.u.			7.56	7.63	7.15	7.15
Field Conductiv	ity umho/cm			525.00	500.00	1460.00	1580.00
Hardness	mg/l						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

-	SAMPLE ID: SAMPLE DATE:	PP-P1-01 4/05/88	PP-P1-02 6/20/88	PP-P3 12/27/84	PP-P3 1/02/85	PP-P3R-01 4/05/88	PP-P3R-02 6/20/88
COMPOUNDS	TINU						
Alkalinity	mg/l	668.00	626.00	431.00	437.00	494.00	479.00
Chloride	mg/l	252.00	176.00	39.00	37.00	47.00	46.00
Chemical Oxygen							
Phenol	ug/l		11.00 J/	5.00 /U	5.00 /U	6.00	8.00 J/
Sulfate	mg/l						•
Nitrate Nitrogen	n mg/l			•			
Field pH	s.u.			6.93	6.85		
Field Conductivi	ity umaho/cmu			935.00	1020.00		
Hardness	mg/L						

	SAMPLE ID: SAMPLE DATE:	PP-P4 12/27/84	PP-P4 1/02/85	PP-P4R-01 4/05/88	PP-P4R-02 6/20/88	PP-P4R-91 4/05/88	PP-P5 12/27/84
COMPOUNDS	UNIT						
Alkalinity	mg/l	325.00	318.00	559.00	622.00	531.00	286.00
Chloride	mg/l	23.00	22.00	149.00	188.00	152.00	20.00
Chemical Oxygen	Demand mg/L						
Phenol	ug/l	5.00 /U	5.00 /U	6.00	14.00 J/		5.00 /U
Sulfate	mg/l		-		•		
Nitrate Nitroger	n mg/l			•			
Field pH	s.u.	7.35	7.00				7.33
Field Conductivi	ity umuho/cm	775.00	710.00				685.00
Hardness	mg/l						

Sampli Sampli	E ID: E DATE:	PP-P5 1/02/85	PP-P6 12/27/84	PP-P6 1/02/85	PP-P6-01 4/06/88	PP-P6-02 6/14/88	PP-P6-92 6/14/88
COMPOUNDS	UNIT						
Alkalinity	mg/l	290.00	263.00	282.00	273.00	277.00	274.00
Chloride	mg/l	21.00	15.00	14.00	16.00	18.00	18.00
Chemical Oxygen Dema							
Phenol	ug/l	5.00 /U	5.00 /U	5.00 /U			
Sulfate	mg/l	·					
Nitrate Nitrogen	mg/l			•			
Field pH	s.u.	6.98	7.73	7.20			
Field Conductivity	umho/cm	650.00	590.00	590.00			
Hardness	mg/l						

	LE ID: LE DATE:	PP-P7 12/27/84	PP-P7 1/02/85	PP-P7-01 4/05/88	PP-P7-02 6/20/88	PP-PW1-01 4/08/88	PP-PW1-91 4/08/88
COMPOUNDS	UNIT						
Alkalinity Chloride Chemical Oxygen Demo Phenol Sulfate	mg/l mg/l and mg/l ug/l mg/l	366.00 44.00 5.00 /U	359.00 41.00 5.00 /U	444.00 44.00	410.00 40.00 8.00 J/	270.00 11.00	282.00 11.00
Nitrate Nitrogen Field pH Field Conductivity Hardness	mg/l s.u. umho/cm mg/l	7.30 805.00	7.33 755.00	•			

	SAMPLE ID: SAMPLE DATE:	PP-PWG 3/07/80	PP-PWG 12/27/84	PP-PUG 1/02/85	PP-PWN 3/07/80	PP-PWH 12/27/84	PP-PWH 1/02/85
COMPOUNDS	UNIT						
Alkalinity	mg/l	708.00	772.00	774.00	464.00	304.00	294.00
Chloride	mg/t	26.00	31.00	31.00	50.00	20.00	20.00
Chemical Oxygen	Demand mg/l	12.00			21.00		
Phenol	ug/l		5.00 /u	5.00 /U		5.00 /U	5.00 /U
Sulfate	mg/l	72.00		_	65.00		•
Nitrate Nitroge	n mg/l	13.00			28.00		
Field pH	s.u.	6.55	6.54	6.50	6.75	7.24	7.11
Field Conductiv	ity umho/cm	1490.00	1490.00	1560.00	1310.00	650.00	645.00
Hardness	mg/l	900.00			670.00		

SAMPLE ID: SAMPLE DAT	=""	PP-PWO-02 6/15/88	SCALE HS&NP1 3/07/80
COMPOUNDS	UNIT		
Alkalinity	mg/l	272.00	348.00
Chloride	mg/l	13.00	12.00
Chemical Oxygen Demand	mg/l		10.00 /U
Phenol	ug/l	13.00 J/	-
Sulfate	mg/l	•	32.00
Nitrate Nitrogen	mg/l		4.00
Field pH	s.u.		7.10
Field Conductivity	umho/cm		745.00
Hardness	mg/l		420.00

⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

HISTORICAL LEACHATE DATA
VOLATILE ORGANIC COMPOUNDS

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL HISTORICAL LEACHATE VOLATILES ANALYSIS TYPE: Volatiles MATRIX: Leachate

	LE ID: Le date:	LEACH1 5/01/84	LEACH2 5/01/84	PP-LLA1-01 4/08/88	PP-LLA3-02 6/15/88	PP-LLA3-92 6/15/88	PP-LLB1-02 6/15/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l						
Chloroethane	ug/l						
Methylene Chloride	ug/l		44.00				
Acetone	ug/l						
1,1-Dichloroethene	ug/l			-			
1,1-Dichloroethane	ug/l		7.00				
Total 1,2-Dichloroe							
Chloroform	ug/l						
2-Butanone	ug/l						
1,1,1-Trichloroetha	ne ug/l						
1,2-Dichloropropane					0.65 J/		
Benzene	ug/l		4.40		2.40 J/	1.00 J/	7.60 J
4-Methyl-2-Pentanon							
2-Hexanone	ug/l						
Tetrachloroethene	ug/l						
Toluene	ug/l	5.40	260.00	730.00 J/	65.00 J/	55.00 J/	190.00 J
Chlorobenzene	ug/l			·	0.78 J/	0.27 J/	
Ethylbenzene	ug/l		16.00		2.30 J/	2.00 J/	1.00 J
Styrene	ug/l				0.61 J/	-	2.60 J
Total Xylenes	ug/l		76.00		·		-•
No Compounds Detect							
trans-1,2-Dichloroe		0.90	15.00				
cis-1.2-Dichloroeth							
1,4-Dichlorobenzene	• • •				16.00 J/	12.00 J/	17.00 J/
m and p-Xylene	ug/l				20.00 J/	17.00 J/	51.00 J
o-Xylene	ug/l				21.00 J/	18.00 J/	62.00 J
1,2-Dichlorobenzene	ug/l				0.96 J/	0.51 J/	2.60 J/

APPENDIX C
WINNEBAGO RECLAMATION LANDFILL HISTORICAL LEACHATE VOLATILES
ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE ID: Sample dat		PP-LLC3-03 8/03/88	PP-LLC3-93 8/03/88	PP-LLC6-03 8/03/88	PP-LLD1-04 6/08/89	PP-LLD1-94 6/08/89	PP-LLE7-01 4/08/88
COMPOUNDS	UNIT						
Chloromethane	ug/l				2.00 /J	3.00 /J	
Vinyl Chloride	ug/l				54.00	55.00	
Chloroethane	ug/l				10.00	11.00	
Methylene Chloride	ug/l				13.00 /B	10.00 /B	
Acetone	ug/l				14000.00 J/BD	18000.00 J/BD	
1,1-Dichloroethene	ug/l			•			
1,1-Dichloroethane	ug/l				53.00	57.00	
Total 1,2-Dichloroethene	ug/l				21.00	22.00	
Chloroform	ug/l						
2-Butanone	ug/l				22000.00 J/D	20000.00 J/D	
1,1,1-Trichloroethane	ug/l				•	•	
1,2-Dichloropropane	ug/l	0.38 J/	2.00 J/	0.23 J/	3.00 /J	3.00 /J	
Benzene	ug/l	7.00 J/	6.80 J/	6.50 J/	•	•	8.90 R/
4-Methyl-2-Pentanone	ug/l	-	-	•	LOV 00.0001	1400.00 /DJ	
2-Hexanone	ug/l				240.00 J/E	260.00 J/E	
Tetrachloroethene	ug/l						
Toluene	ug/l	24.00 J/	20.00 J/	35.00 J/	320.00 J/E	310.00 J/E	106.10 R/
Chlorobenzene	ug/l	0.34 J/	1.00 J/	1.20 J/	5.00 UJ/U	5.00 UJ/U	
Ethylbenzene	ug/l	2.40 J/	2.30 J/	5.00 J/	49.00 J/	49.00 J/	33.00 R/
Styrene	ug/l	2.50 J/	2.40 J/	2.20 J/	5.00 UJ/U	5.00 UJ/U	2.84 R/
Total Xylenes	ug/l				190.00 J/X	170.00 J/X	
No Compounds Detected	ug/l				•	·	
trans-1,2-Dichloroethene	ug/l						
cis-1,2-Dichloroethene	ug/l		0.32 J/				15.20 R/
1,4-Dichlorobenzene	ug/l	26.00 J/	30.00 J/	25.00 J/			2.54 R/
m and p-Xylene	ug/l	53.00 J/	45.00 J/	103.00 J/			27.40 R/
o-Xyl ene	ug/l	43.00 J/	40.00 J/	61.00 J/			33.70 R/
1,2-Dichlorobenzene	ug/l	•	0.36 J/	•••			

## APPENDIX C WINNEBAGO RECLAMATION LANDFILL HISTORICAL LEACHATE VOLATILES ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE ID SAMPLE DA	-	PP-LLE7-91 4/08/88	PP-LLF1-01 4/08/88	PP-LLF7-04 6/08/89	PP-LLG3-02 6/16/88	PP-LLG4-04 6/08/89	PP-LLG7-02 6/16/88
COMPOUNDS	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l			12.00	6.60 J/		
Chloroethane	ug/l	0.83 R/					
Methylene Chloride	ug/l			5.00 UJ/BJ		5.00 UJ/BJ	
Acetone	ug/l			76.00 J/		310.00 UJ/BD	
1,1-Dichloroethene	ug/l			-	38.00 J/		
1,1-Dichloroethane	ug/l		22.00 R/		27.00 J/		
Total 1,2-Dichloroethene	ug/l					220.00 /D	
Chloroform	ug/l				12.00 J/		
2-Butanone	ug/l			26.00 J/		22.00 J/DJ	
1,1,1-Trichloroethane	ug/l				1.10 J/		
1,2-Dichloropropane	ug/l						
Benzene	ug/l		1.40 J/		4.30 J/		2.00 J/
4-Methyl-2-Pentanone	ug/l						
2-Hexanone	ug/l					65.00	
Tetrachloroethene	ug/l					17.00	
Taluen <del>e</del>	ug/l		57.00 J/	47.00 J/		150.00 J/	170.00 J/
Chlorobenzene	ug/l		5.10 R/	5.00 UJ/U		5.00 UJ/U	5.00 J/
Ethylbenzene	ug/l		5.70 J/	65.00 J/		77.00 J/	
Styrene	ug/l			5.00 UJ/U		5.00 UJ/U	
Total Xylenes	ug/l			230.00 J/X		300.00 J/X	
No Compounds Detected	ug/l						
trans-1,2-Dichloroethene	ug/l				49.00 J/		
cis-1,2-Dichloroethene	ug/l	43.10 R/			12.00 J/		
1,4-Dichlorobenzene	ug/l	9.45 R/	7.80 R/				
m and p-Xylene	ug/l		•		1.60 J/		18.00 J/
o-Xylene	ug/l		2.70 J/				31.00 J/
1,2-Dichlorobenzene	ug/l		0.53 R/				

### APPENDIX C WINNEBAGO RECLAMATION LANDFILL HISTORICAL LEACHATE VOLATILES ANALYSIS TYPE: Volatiles MATRIX: Leachate

SAMPLE I Sample D		PP-LLH2-03 8/03/88	PP-LL15-03 8/03/88	PP-LLK2-01 4/08/88	PP-LLMHE-02 6/16/88	PP-LLMHE-04 6/08/89	PP-LLMHW-01 4/08/88
<u>COMPOUNDS</u>	UNIT						
Chloromethane	ug/l						
Vinyl Chloride	ug/l					3.00 /J	10.50 J/
Chloroethane	ug/l						
Methylene Chloride	ug/l					2.00 N1\B1	
Acetone	ug/l					28.00 UJ/B	
1,1-Dichloroethene	ug/l						
1,1-Dichloroethane	ug/l			0.60 R/			
Total 1,2-Dichloroethen						6.00	
Chloroform	ug/L					40.00.00	
2-Butanone	ug/l					10.00 R/U	
1,1,1-Trichloroethane	ug/l						
1,2-Dichtoropropane	ug/l			/ 10.5/			2.07.14
Benzene	ug/l			4.10 R/			2.97 J/
4-Methyl-2-Pentanone	ug/l						
2-Hexanone Tetrachloroethene	ug/l						
Toluene	ug/l	119.00 J/	125.00 J/	165.60 R/	20.00 J/	19 00 17	442.40.17
Chlorobenzene	ug/i ug/i	119.00 3/	125.00 3/	103.60 K/	20.00 3/	18.00 J/ 5.00 UJ/U	112.60 J/
Ethylbenzene	ug/t ug/t			16.00 R/		5.00 UJ/U	36.60 J/
Styrene	ug/t ug/t	3.90 J/	10.00 J/	8.65 R/		5.00 UJ/U	5.11 J/
Total Xylenes	ug/l	3.70 3/	10.00 37	0.03 K/		80.00 J/X	3.11 3/
No Compounds Detected	ug/l					00.00 J/A	
trans-1,2-Dichloroethen							
cis-1,2-Dichloroethene	ug/l	6.90 J/	68.00 J/				5.40 J/
1,4-Dichlorobenzene	ug/l	5.40 J/	17.00 J/				8.47 J/
m and p-Xylene	ug/l	55.00 J/	34.00 J/	25.10 R/	22.00 J/		46.90 J/
o-Xylene	ug/l	30.00 J/	28.00 J/	28.40 R/	18.00 J/		39.90 J/
1,2-Dichlorobenzene	ug/l	22.32 4/	20.00 0/	50.40 R/	.0.00 0/		0.32 1/

#### APPENDIX C WINNEBAGO RECLAMATION LANDFILL HISTORICAL LEACHATE VOLATILES

ANALYSIS TYPF: Volatiles MATRIX: Leachate

SAMPLE I		PP-LLMHW-02 6/16/88	PP-SB01-04 6/08/89	PP-TB01-04 6/08/89
COMPOUNDS	UNIT			
Chloromethane	ug/l			
Vinyl Chloride	ug/l			
Chloroethane	ug/l			
Methylene Chloride	ug/L		5.00 UJ/BJ	2.00 N1\B1
Acetone	ug/L			37.00 UJ/B
1,1-Dichloroethene	ug/l			•
1,1-Dichloroethane	ug/l			
Total 1,2-Dichloroethen	<u>-</u> .			
Chloroform	ug/l			
2-Butanone	ug/l		10.00 R/U	10.00 R/U
1,1,1-Trichloroethane	ug/l			
1,2-Dichloropropane	ug/l			
Benzene	ug/l			
4-Methyl-2-Pentanone	ug/l			
2-Hexanone	ug/l			
Tetrachloroethene	ug/l			
Toluene	ug/l		5.00 UJ/U	5.00 UJ/U
Chlorobenzene	ug/l		5.00 UJ/U	5.00 UJ/U
Ethylbenzene	ug/l		5.00 UJ/U	5.00 UJ/U
Styrene	ug/l		5.00 UJ/U	5.00 UJ/U
Total Xylenes	ug/l		5.00 UJ/U	5.00 UJ/U
No Compounds Detected	ug/l	0.00		
trans-1,2-Dichloroethen	e ug/l			
cis-1,2-Dichloroethene	ug/l			
1,4-Dichlorobenzene	ug/l			
m and p-Xylene	ug/l			
o-Xylene	ug/l			
1,2-Dichlorobenzene	ug/l			

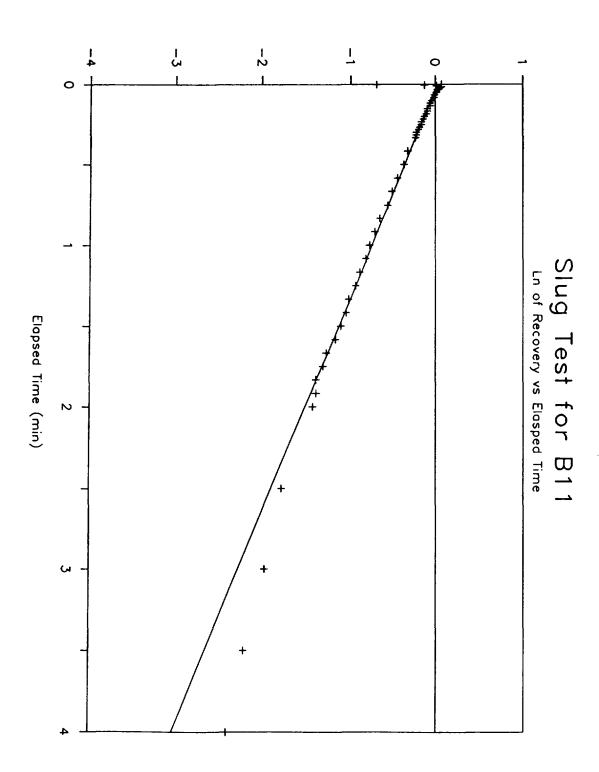
⁽¹⁾ Results are reported with qualifiers (Data Validation Qualifier/Laboratory Qualifier) to the right of the value.

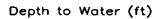
# APPENDIX D PERMEABILITY TEST RESULTS

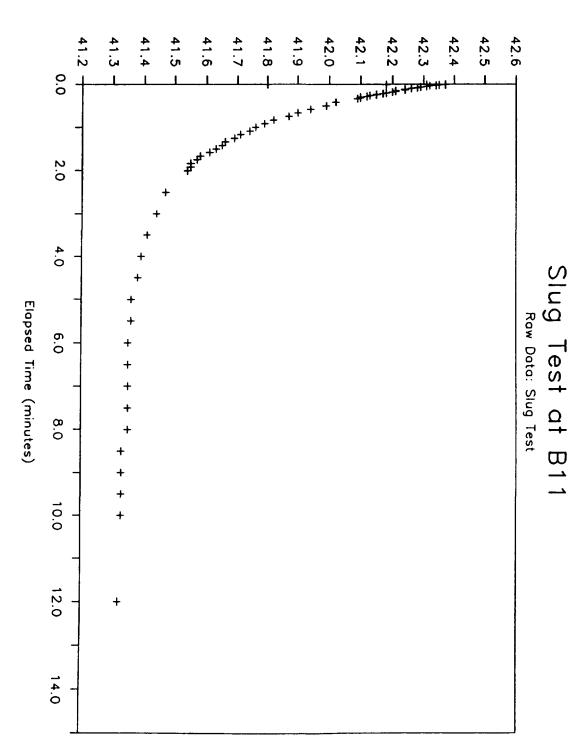
#### SLUG TEST RESULTS FOR: 811 Winnebago Reclamation Landfill

WELL INFORMATION								
A-1-A-1-A-1-A-1-A-1-A-1-A-1-A-1-A-1-A-1	••••••••••••••••••••••••••••••••••••••		• • • • • • • • • • • • • • • • • • • •				••••••	• • • • • • • •
Casing Diameter (in	-	•		2				
Effective Casing RA		rc)		1.28				
Screen Diameter (in	•			2.0				
Effective RADIUS (in				1.89				
Screen Length (ft)(		5.0						
Aquifer Thickness (				200.0				
Well Penetration (f	t)(H)			8.75				
CALCULATED PARAMETE	 De		•••••••			•••••		••••••
CHICOTALED LYKARETE	ng 						•••••	
L / rw				31.7				
A				2.45				
 B				0.40				
C				NA				
ln ((D-h)/rw)				7.10				
In (Re / rw) Fully i	Penetratino	1		NA				
In (Re / rw)Partial				2.27				
in (Re / rw)Partial	•	-	)	2.34				
1/t * In (Yo /Yt)	.,		•	0.77				
***************************************							· · · · · · · · · · · · · · · · · · ·	
RESULTS				FT/MIN	-	GPD/SQ.FT		
Hydraulic Conductiv	iou Enlluc			NA	NA.	NA	NA.	••••••
Hydraulic Conductiv				1.98E-03		2.13E+01		
Hydraulic Conductiv				2.04E-03		2.20E+01		
nyorautic conductiv			,	2.046.03				
			;	SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
•••••	• • • • • • • • • • • • • • • • • • • •		•••••		• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	
Transmissivity Fully	y-P			NA	NA	NA	NA	
Transmissivity Part				3.95E-01	569.2			
Transmissivity Part	ial-P (>6)			4.08E-01	587.8	4396.0	6.32E-04	
****************			. ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ	 Well B11			• • • • • • • • • • • •	*******
			,	Depth	Vater	Natural Log	of	REGR
				to		Water Level	•	LINE
		1	ime (min)		Change		•	CALC.
Regression	Output:		0.0000	42.37	1.07	0.068		0.019
Constant		0.019	0.0033	41.80	0.50	-0.693		0.017
Std Err of Y Est		0.020	0.0066	42.18	88.0			0.014
R Squared		0.998	0.0099	42.31	1.01	0.010		0.012
No. of Observations		36	0.0133	42.37	1.07	0.068		0.009
Degrees of Freedom		34	0.0166	42.37	1.07	0.068	•	0.007
			0.0200	42.35	1.05	0.049 1		0.004
X Coefficient(s)	-0.7652		0.0233	42.35	1.05	0.049		0.001
Std Err of Coef.	0.0057		0.0266	42.34	1.04	0.039 1		-0.001
			0.0300	42.34	1.04	0.039		-0.004
			0.0333	42.32	1.02	0.020		-0.006
			0.0500	42.31	1.01	0.010		-0.01 <del>9</del>
			0.0666	42.29	0.99			-0.032
			0.0833	42.28	0.98	-0.020 1	•	-0.045

	Well B11			
	Depth	Water	Natural Log of	REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	42.26	0.96	-0.041 *	-0.057
0.1166	42.24	0.94	-0.062 *	-0.070
0.1333	42.24	0.94	-0.062 *	-0.083
0.150 <del>0</del>	42.21	0.91	-0.094 *	-0.096
0.1666	42.21	0.91	-0.094 *	-0.108
0.1833	42.20	0.90	-0.105 *	-0.121
0.2000	42.18	0.88		-0.134
0.2166	42.17	0.87	-0.139 *	-0.147
0.2333	42.15	0.85	-0.163 *	-0.159
0.2500	42.15	0.85	-0.163 *	-0.172
0.2666 0.2833	42.13 42.12	0.83 0.82	-0.186 * -0.198 *	-0.185 -0.198
0.3000	42.12	0.80	-0.223 *	-0.210
0.3166	42.10	0.80	-0.223 *	-0.223
0.3333	42.09	0.79	-0.236 *	-0.236
0.4167	42.02	0.72	-0.329 *	-0.300
0.5000	41.99	0.69	-0.371 *	-0.363
0.5833	41.94	0.64	-0.446 *	-0.427
0.6667	41.90	0.60	-0.511 *	-0.491
0.7500	41.87	0.57	-0.562 *	-0.555
0.8333	41.82	0.52	-0.654 *	-0.618
0.9167	41.79	0.49	-0.713 *	-0.682
1.0000	41.76	0.46	-0.777 *	-0.746
1.0833	41.74	0.44	-0.821 *	-0.810
1.1670	41.71	0.41	-0.892 *	-0.874
1.2500	41.69	0.39	-0.942 *	-0.937
1.3333	41.66	0.36	-1.022 *	-1.001
1.4166	41.65	0.35	-1.050 *	-1.065
1.5000	41.63	0.33	-1.109 <b>*</b> -1.171 <b>*</b>	-1.129
1.5833 1.6667	41.61 41.58	0.31 0.28	-1.273 *	-1.192 -1.256
1.7500	41.57	0.27	-1.309 *	-1.320
1.8333	41.55	0.25	-1.386 *	-1.384
1.9167	41.55	0.25	-1.386 *	-1.447
2.0000	41.54	0.24	-1.427	-1.511
2.5000	41.47	0,17	-1.772	-1.894
3.0000	41.44	0.14	-1.966	-2.276
3.5000	41.41	0.11	-2.207	-2.659
4.0000	41.39	0.09	-2.408	-3.041
4.5000	41.38	0.08	-2.526	-3.424
5.0000	41.36	0.06	-2.813	-3.807
5.5000	41.36	0.06	-2.813	-4.189
6.0000	41.35	0.05	-2.996	-4.572
6.5000	41.35	0.05	-2.996	-4.954
7.0000 7.5000	41.35	0.05 0.05	-2.996 -2.996	-5.337 -5.730
8.0000	41.35 41.35	0.05	-2.996 -2.996	-5.720 -6.102
8.5000	41.33	0.03	-2.99 <del>0</del> -3.507	-6.102 -6.4 <b>8</b> 5
9.0000	41.33	0.03	-3.507	-6.867
9.5000	41.33	0.03	-3.507	-7.250
10.0000	41.33	0.03	-3.507	-7.632
12.0000	41.32	0.02	-3.912	-9.163
14.0000	41.30	0.00	ERR	
Maximum ≠	42.37			
Kinimus =	41.30			







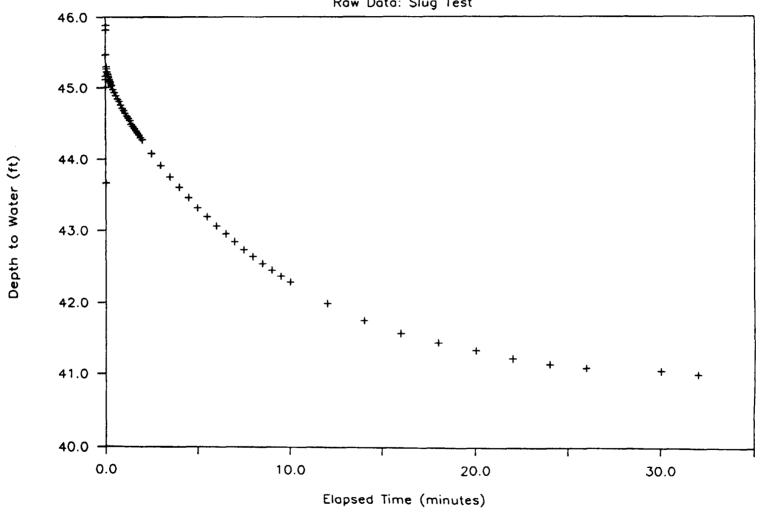
#### SLUG TEST RESULTS FOR: 811A Winnebago Reclamation Landfill

WELL INFORMATION							
Casing Diameter (in)			2				
Effective Casing RAD	IUS (in)(rc)		1.00				
Screen Diameter (in)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2.0				
Effective RADIUS (in	)(rw)		1.89				
Screen Length (ft)(L)			5.0				
Aquifer Thickness (fi	t)(D)		200.0				
Well Penetration (ft)			36.22				
•••••			• • • • • • • • •	• • • • • • • • • • • • • • • • • • • •			• • • • • • • •
CALCULATED PARAMETERS	5						
			• • • • • • • • • • • • • • • • • • • •	•••••			• • • • • • • • • • • • • • • • • • • •
L / rw			31.7				
A			2.45				
B			0.40				
C			NA				
ln ((D-h)/rw)			6.95				
In (Re / rw) Fully Po	_		NA O TO				
In (Re / rw)Partially			2.72 2.82				
<pre>ln (Re / rw)Partially 1/t * in (Yo /Yt)</pre>	/ Penetrating(>0)		0.12				
// (n (10 /1t)			U. 12				
RESULTS			FT/MIN	FT/DAY	GPD/SQ.FT	CH/SEC	
			• • • • • • • • • • • • • • • • • • • •			• • • • • • • • • •	
Hydraulic Conductivii			NA	NA	NA	MA	
Hydraulic Conductivii	•		-	_	2.45E+00		
Hydraulic Conductivii	ty Partial-P (>6)		2.35E-04	3.39E-01	2.53E+00	1.20E-04	
		:	SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully	·P		NA.	HA	NA NA	NA.	
Transmissivity Partia			4.55E-02	65.5	490.2	7.05E-05	
Transmissivity Partia			4.70E-02	67.8	506.7	7.28E-05	
***************************************		• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • •			
			Depth		Natural Log		REGR
	_		to		Water Level		LINE
	T	ime (min)	Water	Change	Change		CALC.
Dannani f	Submut .	0.0000	5.15	-35.85	ERR		1.444
Regression ( Constant	1.444	0.0033	5.36	-35.64	ERR		1.444
Std Err of Y Est	0.038	0.0066	49.19	8.19	2.103		1.444
R Squared	0.988	0.0099	43.66	2.66	0.978		1.443
No. of Observations	58	0.0133	43.66	2.66	0.978		1.443
Degrees of Freedom	56	0.0166	45.01	4.01	1.389		1.442
		0.0200	45.82	4.82	1.573		1.442
X Coefficient(s) -(	.1203	0.0233	45.89	4.89	1.587 *		1.442
* *	0.0018	0.0266	45.47	4.47	1.497 *		1.441
		0.0300	45.17	4.17	1.428 *		1.441
		0.0333	45.12	4.12	1.416 =		1.440
		0.0500	45.30	4.30	1.459 *		1.438
		0.0666	45.27	4.27	1.452 *		1.436
		0.0833	45.23	4.23	1.442 *		1.434

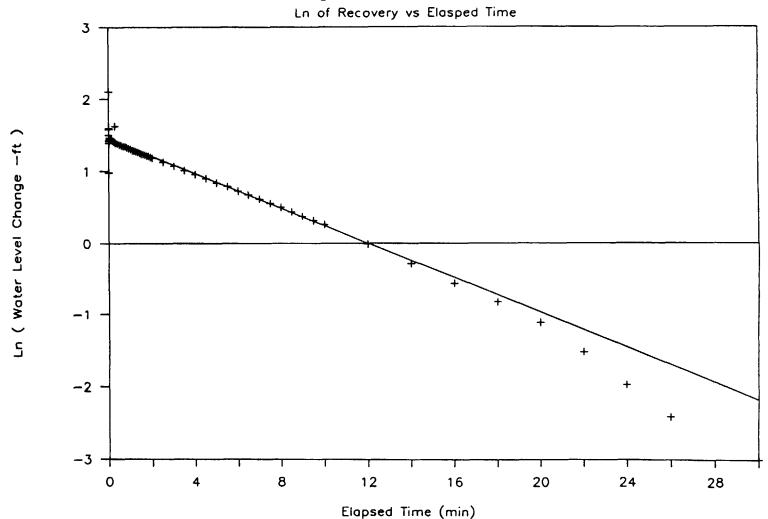
Well B11A	Depth		Natural Log o	
Time (min)	to	Change	Water Level	LINE
Time (min)	Water	cnarge	Change	CALC.
0.1000	45.22	4.22	1.440 *	1.432
0.1166	45.20	4.20	1.435 *	1.430
0.1333	45.19	4.19	1.433 *	1.428
0.1500	45.17	4.17	1.428 *	1.426
0.1666	45.16	4.16	1.426 *	1.424
0.1833	45.14	4.14	1.421 *	1.422
0.2000	45.12	4.12	1.416 *	1.420
0.2166	45.11	4.11	1.413 *	1.418
0.2333	45.11	4.11	1.413 *	1.416
0.2500	45.09	4.09	1.409 *	1.414
0.2666	45.08	4.08	1.406 *	1.412
0.2833	45.06	4.06	1.401 *	1.410
0.3000	46.06	5.06	1.621 *	1.408
0.3166	45.04	4.04	1.396 *	1.406
0.3333 0.4167	45.03 44.98	4.03 3.98	1.394 * 1.381 *	1.404
0.5000	44.93	3.93	1.369 *	1.394 1.384
0.5833	44.89	3.89	1.358 *	1.374
0.6667	44.84	3.84	1.345 *	1.364
0.7500	44.81	3.81	1.338 *	1.354
0.8333	44.76	3.76	1.324 *	1.344
0.9167	44.71	3.71	1.311 *	1.334
1.0000	44.68	3.68	1.303 *	1.324
1.0833	44.64	3.64	1.292 *	1.314
1.1670	44.60	3.60	1.281 *	1.304
1.2500	44.57	3.57	1.273 *	1.294
1.3333	44.54	3.54	1.264 *	1.284
1.4166	44.49	3.49	1.250 *	1.274
1.5000	44.46	3.46	1.241 •	1.264
1.5833	44.43	3.43	1.233 *	1.254
1.6667 1.7500	44.40 44.37	3.40 3.37	1.224 * 1.215 *	1.244 1.234
1.8333	44.34	3.34	1.206 *	1.224
1.9167	44.30	3.30	1.194 *	1.214
2.0000	44.27	3.27	1.185 *	1.204
2.5000	44.08	3.08	1.125 *	1.144
3.0000	43.91	2.91	1.068 *	1.084
3.5000	43.75	2.75	1.012 *	1.023
4.0000	43.60	2.60	0.956 *	0.963
4.5000	43.45	2.45	0.896 *	0.903
5.0000	43.31	2.31	0.837 *	0.843
5.5000	43.19	2.19	0.784 *	0.783
6.0000	43.06	2.06	0.723 *	0.723
6.5000	42.95	1.95	0.668 *	0.663
7.0000 7.5000	42.84 42.73	1.84 1.73	0.610 * 0.548 *	0.602 0.542
8.0000	42.64	1.64	0.495 *	0.482
8.5000	42.54	1.54	0.432 *	0.422
9.0000	42.45	1.45	0.372 *	0.362
9.5000	42.37	1.37	0.315 *	0.302
10.0000	42.29	1.29	0.255 *	0.242
12.0000	41.99	0.99	-0.018	0.001
14.0000	41.75	0.75	-0.288	-0.239
16.0000	41.57	0.57	-0.562	-0.480
18.0000	41.44	0.44	-0.821	-0.721
20.0000	41.33	0.33	-1.109	-0.961
22.0000	41.22	0.22	-1.514	-1.202
24.0000	41.14	0.14	-1.966	-1.442

Well B11A	Depth	Water	Natural Log of	REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
			*******	• • • • • • • • •
26.0000	41.09	0.09	-2.408	-1.683
30.0000	41.05	0.05	-2.996	-2.164
32.0000	41.00	0.00	ERR	
Maximum =	49.19			
Minimum =	41			

# Slug Test at B11A Row Data: Slug Test



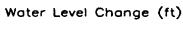
Slug Test for B11A

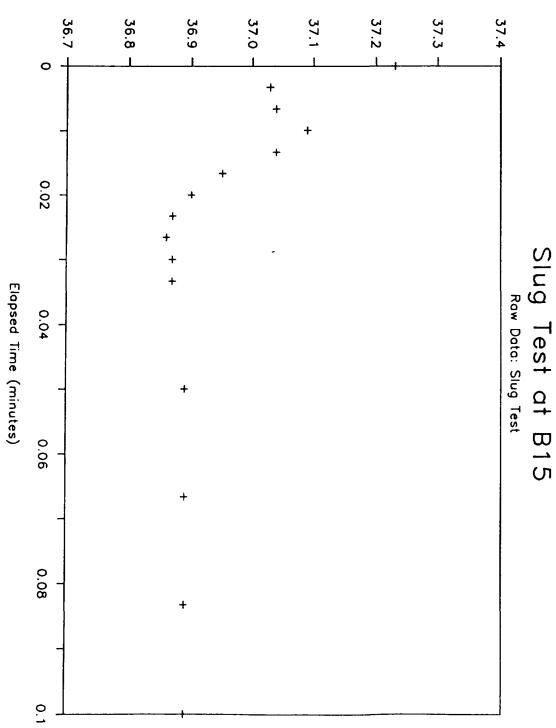


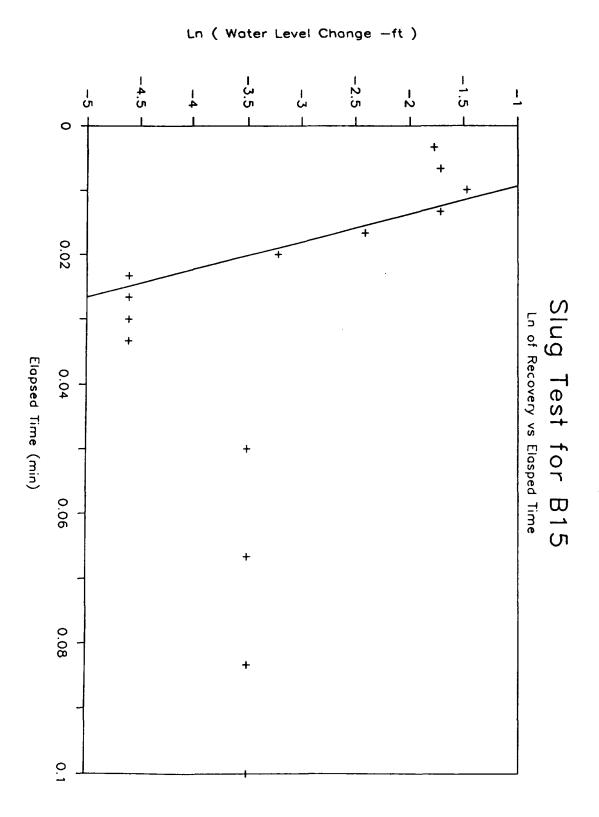
# BAILDOWN TEST RESULTS FOR: B15 Winnebago Reclamation Landfill

WELL INFORMATION							
Carina Diameter (In)			2	• • • • • • • • • • • • • • • • • • • •			• • • • • • • • •
Casing Diameter (in) Effective Casing RADIUS (in)	(rc)		1.28				
Screen Diameter (in)	(,		2.0				
Effective RADIUS (in)(rw)			1.89				
Screen Length (ft)(L)			3.1				
Aquifer Thickness (ft)(D)			200.0				
Well Penetration (ft)(H)			3.14				
CALCULATED PARAMETERS			******			•••••	• • • • • • • • • • • • • • • • • • • •
L / rw			19.9	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	• • • • • • • • •
A			2.1				
8			0.35				
C			NA				
ln ((D-h)/rw)			7.13				
In (Re / rw) Fully Penetratin	ng		NA				
In (Re / rw)Partially Penetra	ating		1.67				
In (Re / rw)Partially Penetra	sting(>6	<b>)</b>	1.73				
1/t * ln (Yo /Yt)			231.89				
RESULTS		FT/MIN	FT/DAY	GPD/SQ.FT	CH/SEC	•	
							•••••
Hydraulic Conductivity Fully- Hydraulic Conductivity Partia			NA 7.035-01		NA 7.57E+03	NA 3.57E-01	
Hydraulic Conductivity Partia			7.02E-01		7.83E+03	3.69E-01	
		<i>;</i> 		1.052403			
			SQ.FT/KIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully-P	•••••		NA.	NA.	NA	NA NA	••••••
Transmissivity Partial-P			1.40E+02	202303.2	1513059.5	2.17E-01	
Transmissivity Partial-P (>6)	)		1.45E+02	209248.7	1565005.9	2.25E-01	
***************************************							
		Well B15	Depth		Natural Log Water Level		REGR
		Time (min)	to Water	Change			LINE CALC.
		1100E (M111)	Mater	Citariye	Change		
Regression Output:		0.0000	37.23	0.37	-0.994		1.171
Constant	1.171		37.03	0.17			0.406
Std Err of Y Est	0.380		37.04	0.18	-1.715		-0.360
R Squared	0.933		37.09	0.23	-1.470 *		-1.125
No. of Observations	5	0.0133	37.04	0.18	-1.715 *		-1.913
Degrees of Freedom	3	0.0166	36.95	0.09	-2.408 *		-2.679
		0.0200	36.90	0.04	-3.219 *		-3.467
X Coefficient(s) -231.8924		0.0233	36.87	0.01	-4.605 *		-4.232
Std Err of Coef. 35.8273		0.0266	36.86	0.00	-4.605		-4.998
		0.0300	36.87	0.01	-4.605		-5.786
		0.0333	36.87	0.01	-4.605		-6.551
		0.0500	36.89	0.03	-3.507		-10.424
		0.0666	36.89	0.03	-3.507		-14.273
		0.0833	36.89	0.03	-3.507		-18.146

Well B15	Depth		Natural Log of	
** * * * * * * * * * * * * * * * * * * *	to		dater Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	36.89	0.03	-3.507	-22.018
0.1166	36.89	0.03	-3.507	-25.868
0.1333	36.89	0.03	-3.507	-29.741
0.1500	36.89	0.03	-3.507	-33.613
0.1666	36.89	0.03	-3.507	-37.463
0.1833	36.89	0.03	-3.507	-41.335
0.2000	36.89	0.03	-3.507	-45.208
0.2166	36.89	0.03	-3.507	-49.057
0.2333	36.89	0.03	-3.507	-52.930
0.2500	36.89	0.03	-3.507	-56.802
0.2666	36.89	0.03	-3.507	-60.652
0.2833	36.89	0.03	-3.507	-64.524
0.3000	36. <b>89</b>	0.03	-3.507	-68.397
0.3166	36.89	0.03	-3.507	-72.246
0.3333	36.89	0.03	-3.507	-76.119
0.4167	36.89	0.03	-3.507	-95.459
0.5000	36.89	0.03	-3.507	-114.775
0.5833	36.89	0.03	-3.507	-134.092
0.6667	36.89	0.03	-3.507	-153.432
0.7500	36.89	0.03	-3.507	-172.749
0.8333	36.90	0.04	-3.219	-192.065
0.9167 1.0000	36.90 36.90	0.04 0.04	-3.219 -3.219	-211.405 -230.722
1.0833	36.90	0.04	-3.219	-250.038
1.1670	36.90	0.04	-3.219	-269.448
1.2500	36.90	0.04	-3.219	-288.695
1.3333	36.90	0.04	-3.219	-308.011
1.4166	36.90	0.04	-3.219	-327.328
1.5000	36.90	0.04	-3.219	-346.668
1.5833	36.90	0.04	-3.219	-365.985
1.6667	36.90	0.04	-3.219	-385.324
1.7500	36.90	0.04	-3.219	-404.641
1.8333	36.90	0.04	-3.219	-423.958
1.9167	36.90	0.04	-3.219	-443.297
2.0000	36.90	0.04	-3.219	-462.614
2.5000	36.89	0.03	-3.507	-578.560
3.0000	36.89	0.03	-3.507	-694.507
3.5000	36.89	0.03	-3.507	-810.453
4.0000	36.89	0.03	-3.507	-926.399
4.5000	36.90	0.04	-3.219	
5.0000	36.89	0.03	-3.507	
5.5000	36.89	0.03	-3.507	
6.0000	36.89	0.03	-3.507 -7.310	
6.5000	36.90 36.90	0.04	-3.219 -7.210	
7.0000 7.5000	36.90 36.90	0.04 0.04	-3.219 -3.219	
8.0000	36.89	0.04	-3.21 <b>9</b> -3.507	
8.5000	36.90	0.04	-3.219	
9.0000	36.90	0.04	-3.219	
9.5000	36.90	0.04	-3.219	
10.0000	36.90	0.04	-3.219	







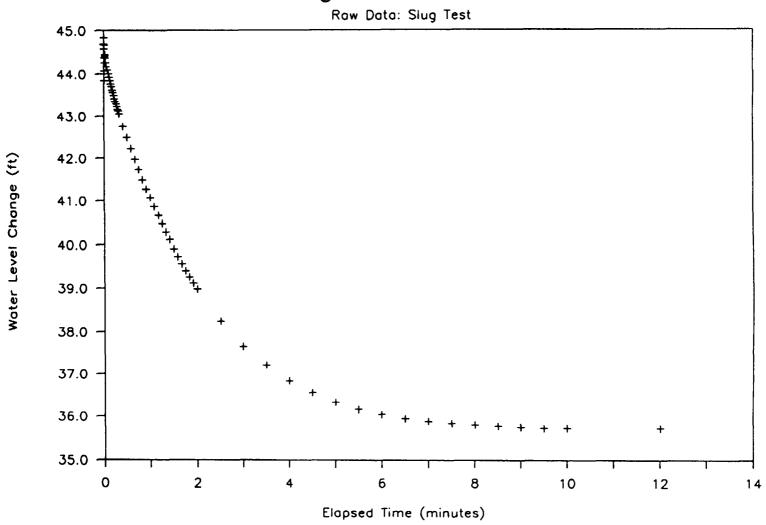
### SLUG TEST RESULTS FOR: 815P Winnebago Reclamation Landfill

WELL INFORMATION							
Casing Diameter (in)	`		2				
Effective Casing RAD			1.00				
Screen Diameter (in)			2.0				
Effective RADIUS (in			1.89				
Screen Length (ft)(l	• • •		5.0				
Aquifer Thickness (1			200.0				
Well Penetration (fi			29.71				
	*****			•••••			
CALCULATED PARAMETER	l <b>s</b>			•••••			
L / rw			31.7				
A			2.45				
8			0.40				
C			NA				
ln ((D-h)/rw)			6.99				
in (Re / rw) fully F	enetrating		NA				
in (Re / rw)Partiali	y Penetrating		2.67				
ln (Re / rw)Partiall	y Penetrating(>6	>	2.76				
1/t * ln (Yo /Yt)			0.56				
RESULTS		• • • • • • • • • • • • • • • • • • • •	FT/MIN		GPD/SQ.FT	-	
							• • • • • • • •
Hydraulic Conductivi			NA	NA COLUMN		NA .	
Hydraulic Conductivi			1.03E-03		1.11E+01		
Hydraulic Conductivi	ty Partial-P (>6	) 	1.07E-03	1.54E+00	1.15E+01	5.43E-04	
			SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully			NA	KA	NA	NA	
Transmissivity Parti			2.07E-01	297.8	2227.2	3.20E-04	
Transmissivity Parti			2.14E-01	308.0	2303.4	3.31E-04	
•••••		• • • • • • • • • • • • • • • • • • • •				• • • • • • • • • •	
			Depth	Water	Natural Log	of	REGR
			to	level	Water Level		LINE
		Time (min)	Water	Change	<b>~</b> -		CALC.
Regression	Output:	0.0000	44.69	8.99			2.220
Constant	2.220	0.0033	43.84	8.14	2.097		2.218
Std Err of Y Est	0.083	0.0066	44.06	8.36	2.123		2.216
R Squared	0.997	0.0099	44.58	8.88	2.184		2.215
No. of Observations	61	0.0133	44.83	9.13	2.212 *		2.213
Degrees of Freedom	59	0.0166	44.67	8.97	2.194 *		2.211
		0.0200	44.39	8.69			2.209
X Coefficient(s)	-0.5585	0.0233	44.26	8.56			2.207
Std Err of Coef.	0.0038	0.0266	44.36	8.66			2.205
		0.0300	44.42	8.72			2.203
		0.0333	44.45	8.75	2.169 *		2.202
		0.0500	44.26	8.56			2.192
		0.0666	44.17	8.47			2.183
		0.0833	44.09	8.39	2.127 *		2.174

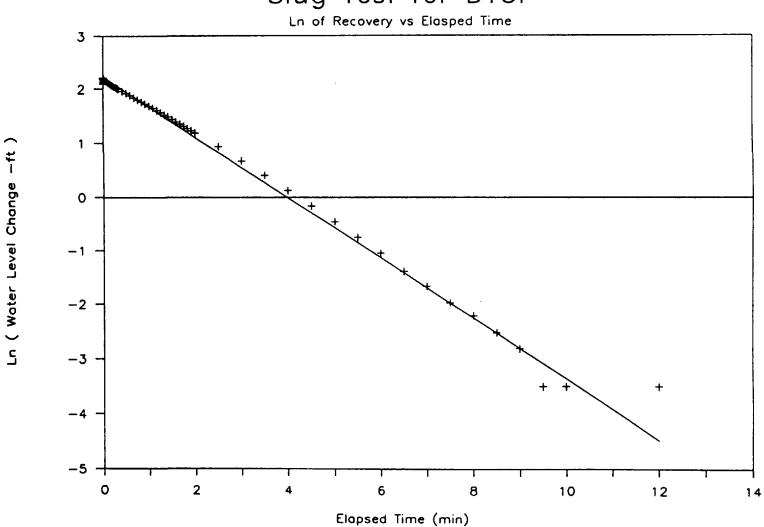
WELL B15P	Depth		atural Log of	REGR
	to	level W	ater Level	LINE
Time (min)	Water	Change	Change	CALC.
	•••••	•••••		******
0.1000	44.00	8.30	2.116 *	2.164
0.1166	43.92	8.22	2.107 *	2.155
0.1333	43.84	8.14	2.097 *	2.146
0.1500	43.76	8.06	2.087 *	2.136
0.1666	43.70	8.00	2.079 *	2.127
0.1833	43.62	7.92	2.069 *	2.118
0.2000	43.56	7.86	2.062 *	2.108
0.2166	43.49	7.79	2.053 *	2.099
0.2333	43.41	7.71	2.043 *	2.090
0.2500	43.35	7.65	2.035 *	2.081
0.2666	43.30	7.60	2.028 *	2.071
0.2833	43.23	7.53	2.019 *	2.062
0.3000	43.16	7.46	2.010 *	2.053
0.3166	43.12	7.42	2.004 *	2.043
0.3333	43.05	7.35	1.995 *	2.034
0.4167	42.75	7.05	1.953 *	1.987
0.5000	42.49	6.79	1.915 *	1.941
0.5833	42.22	6.52	1.875 *	1.894
0.6667	41.97	6.27	1.836 *	1.848
0.7500	41.73	6.03	1.797 *	1.801
0.8333	41.49	5.79	1.756 *	1.755
0.9167	41.27	5.57	1.717 *	1.708
1.0000	41.07	5.37	1.681 *	1.662
1.0833	40.86	5.16	1.641 *	1.615
1.1670	40.66	4.96	1.601 *	1.568
1.2500	40.47	4.77	1.562 *	1.522
1.3333	40.28	4.58	1.522 *	1.475
1.4166	40.11	4.41	1.484 *	1.429
1.5000	39.90	4.20	1.435 *	1.382
1.5833	39.72	4.02	1.391 *	1.336
1.6667	39.56	3.86	1.351 *	1.289
1.7500	39.40 39.26	3.70 3.56	1.308 * 1.270 *	1.243
1.8333 1.9167	39.28 39.12	3.42	1.230 *	1.196 1.150
2.0000	38.98	3.28	1.188 *	1.103
2.5000	38.24	2.54	0.932	0.824
3.0000	37.65	1.95	0.668	0.545
3.5000	37.20	1.50	0.405	0.265
4.0000	36.83	1.13	0.122	-0.014
4.5000	36.55	0.85	-0.163	-0.293
5.0000	36.33	0.63	-0.462	-0.573
5.5000	36.17	0.47	-0.755	-0.852
6.0000	36.05	0.35	-1.050	-1.131
6.5000	35.95	0.25	-1.386	-1.410
7.0000	35.89	0.19	-1.661	-1.690
7.5000	35.84	0.14	-1.966	-1.969
8.0000	35.81	0.11	-2.207	-2.248
8.5000	35.78	0.08	-2.526	-2.527
9.0000	35.76	0.06	-2.813	-2.807
9.5000	35.73	0.03	-3.507	-3.086
10.0000	35.73	0.03	-3.507	-3.365
12.0000	35.73	0.03	-3.507	-4.482

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# Slug Test at B15P



Slug Test for B15P



### SLUG TEST RESULTS FOR: 816 Winnebago Reclamation Landfill

WELL INFORMATION							
0101	· · · · · · · · · · · · · · · · · · ·						
Casing Diameter (in	•		2				
Effective Casing RAI			1.28				
Screen Diameter (in			2.0				
Effective RADIUS (in			1.89				
Screen Length (ft)(			5.0				
Aquifer Thickness (			200.0				
Well Penetration (f	E)(H) 	• • • • • • • • • • • • • • • • • • • •	6.61		••••••		
CALCULATED PARAMETER	RS						
L / rw	• • • • • • • • • • • • • • • • • • • •		31.7		• • • • • • • • • • • • • • • • • • • •		• • • • • • • •
A			2.45				
8			0.40				
C			NA				
ln ((D-h)/rw)			7.34				
In (Re / rw) Fully I	Denetrating		NA				
in (Re / rw)Partial	-		2.15				
In (Re / rw)Partial			2.24				
1/t * in (Yo /Yt)	ty renetiating(20	,	0.64				
		•••••					
RESULTS			FT/MIN	-	GPD/SQ.FT	-	
Hydraulic Conductiv			NA.			NA	
Hydraulic Conductiv	•		1,56E-03		1.68E+01		
Hydraulic Conductiv	•		1.62E-03		1.74E+01		
		, 			• • • • • • • • • • • • • • • • • • • •		
				SQ.FT/DAY	GPD/FT	SQ.H/SEC	
Transmissivity Fully			NA	NA	NA	NA	
Transmissivity Part			3.90E-01	561.8	4201.8	6.04E-04	
Transmissivity Part	ial-P (>6)		4.05E-01	583.1	4360.8	6.27E-04	
		• • • • • • • • • • • • • • • • • • • •					
			Depth	Water	Natural Log	of	REGR
			to	level	Water Level		LINE
		Time (min)	Water	Change	•		CALC.
Regression	Outout:	0.0000	40.62				0.049
Constant	0.049		41.04	0.94			0.047
Std Err of Y Est	0.081		41.23	1.13			0.045
R Squared	0.983		41.26	1.16			0.043
No. of Observations	49		41.25	1.15	0.140 *		0.040
Degrees of Freedom	47		41.23	1.13	0.122 *		0.038
	•	0.0200	41.23	1.13	0.122 *		0.036
X Coefficient(s)	-0.6365	0.0233	41.23	1.13	0.122 *		0.034
Std Err of Coef.	0.0122	0.0266	41.22	1.12	0.113 *		0.032
· · · · · · · · · · · · · · · · · ·		0.0300	41.22	1.12	0.113 *		0.030
		0.0333	41.22	1.12	0.113 *		0.028
		0.0500	41.18	1.08	0.077 *		0.017
		0.0666	41.17	1.07	0.068 *		0.006
		0.0833	41.15	1.05	0.049 *		-0.004

WELL B16	Depth		Natural Log of	REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	41.12	1.02	0.020 *	-0.015
0.1166	41.12	1.02	0.020 *	-0.025
0.1333	41.09	0.99	-0.010 *	-0.036
0.1500	41.07	0.97	-0.030 *	-0.047
0.1666	41.06	0.96	-0.041 *	-0.057
0.1833	41.04	0.94	-0.062 *	-0.068
0.2000	41.04	0.94	-0.062 *	-0.078
0.2166	41.03	0.93	-0.073 *	-0.089
0.2333	41.01	0.91	-0.094 *	-0.100
0.2500	41.00	0.90	-0.105 *	-0.110
0.2666	40.98	0.88	-0.128 *	-0.121
0.2833	40.98	0.88	-0.128 *	-0.131
0.3000	40.96	0.86	-0.151 *	-0.142
0.3166	40.95	0.85	-0.163 *	-0.153
0.3333	40.93	0.83	-0.186 *	-0.163
0.4167	40.89	0.79	-0.236 *	-0.216
0.5000	40.84	0.74	-0.301 *	-0.269
0.5833	40.79	0.69	-0.371 *	-0.322
0.6667	40.76	0.66	-0.416 *	-0.375
0.7500	40.71	0.61	-0.494 *	-0.428
0.8333	40.68	0.58	-0.545 *	-0.482
0.9167	40.65	0.55	-0.598 *	-0.535
1.0000	40.62	0.52	-0.654 *	-0.588
1.0833	40.59	0.49	-0.713 *	-0.641
1.1670	40.57	0.47	-0.755 *	-0.694
1.2500	40.54	0.44	-0.821 *	-0.747
1.3333	40.51	0.41	-0.892 *	-0.800
1.4166	40.49	0.39	-0.942 *	-0.853
1.5000	40.48	0.38	-0.968 *	-0.906
1.5833	40.46	0.36	-1.022 *	-0.959
1.6667	40.43	0.33	-1.109 *	-1.012
1.7500	40.41	0.31	-1.171 *	-1.065
1.8333	40.40	0.30	-1.204 *	-1.118
1.9167	40.38	0.28	-1.273 *	-1.171
2.0000	40.37	0.27	-1.309 *	-1.224
2.5000	40.30	0.20	-1.609 *	-1.542
3.0000 3.5000	40.26 40.24	0.16	-1.833 <b>*</b> -1.966 <b>*</b>	-1.861
4.0000	40.24	0.14 0.11		-2.179
4.5000	40.18	0.08	-2.207 *	-2.497 -2.495
5.0000	40.18	0.08	·2.526 ·2.526	-2.815 -3.134
5.5000	40.16	0.06	-2.813	-3.134 -3.452
6.0000	40.15	0.05	-2.996	·3.770
6.5000	40.15	0.05	-2.996	-4.088
7.0000	40.13	0.03	-3.507	-4.407
7.5000	40.11	0.01	-4.605	-4.725
8.0000	40.11	0.01	-4.605	-5.043

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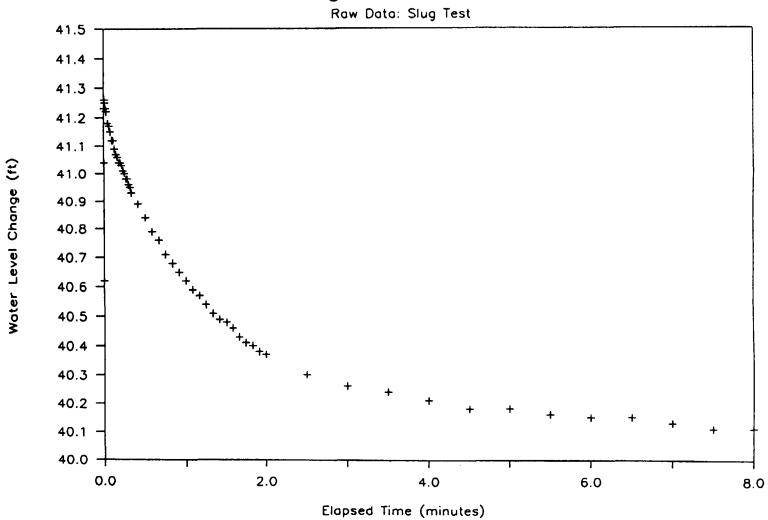
#### SLUG TEST RESULTS FOR: B16A Winnebago Reclamation Landfill

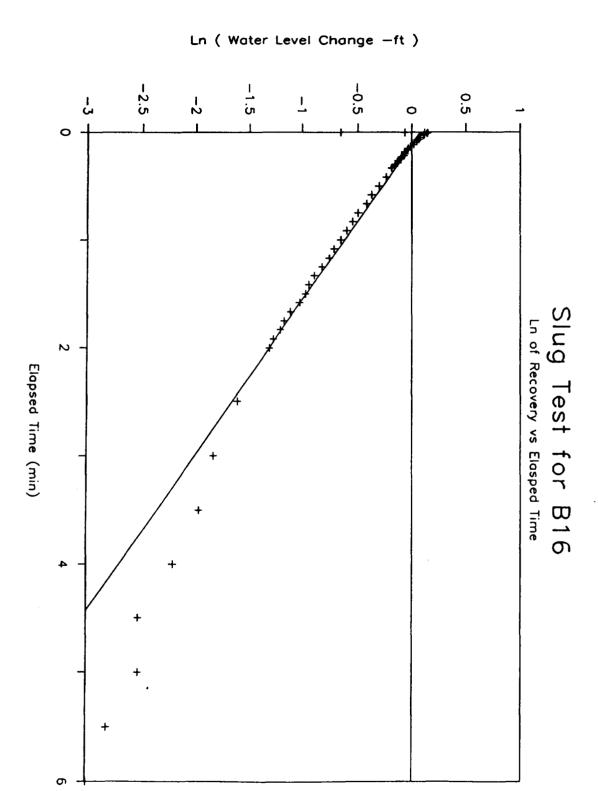
WELL INFORMATION								
A-1-A1 A1 A1		•••••			•••••			
Casing Diameter (in)	•	- •		2				
Effective Casing RAD		c)		1.00				
Screen Diameter (in)				2.0				
Effective RADIUS (in				1.89				
Screen Length (ft)(				5.0				
Aquifer Thickness (1	-			200.0				
Well Penetration (fi	()(H) 			29.10				•••••
CALCULATED PARAMETER	RS							
L / rw				31.7		• • • • • • • • • • • •		
A				2.45				
8				0.40				
Č				NA				
ln ((D-h)/rw)				6.99				
in (Re / rw) Fully F	Penetrating			NA				
In (Re / rw)Partial	_			2.66				
In (Re / rw)Partiall			)	2.75				
1/t * in (Yo /Yt)	•			0.17				
***************************************	• • • • • • • • • • • • • • • • • • • •			• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	••••••	
RESULTS				FT/HIN	-	GPD/SQ.FT		
Hydraulic Conductivi			• • • • • • • • • • • • • • • • • • • •	NA NA			NA NA	
Hydraulic Conductivi				3.06E-04		3.30E+00		
Hydraulic Conductivi				3.17E-04		3.41E+00	1.61E-04	
			, 					
				-	SQ.FT/DAY	GPO/FT	SQ.M/SEC	
Transmissivity Fully				NA	NA	NA	NA	
Transmissivity Parti				6.13E-02	88.2	660.0	9.49E-05	
Transmissivity Parti				6.34E-02	91.3		9.81E-05	
***************************************	• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •					
				Depth		Natural Log		REGR
			<b>.</b>	to		Water Level		LINE
			Time (min)	Water	Change	Change		CALC.
Regression	Output:		0.0000	19.72	-23.06	ERR		1.899
Constant		1.899	0.0033	54.02	11.24	2.419		1.899
Std Err of Y Est		0.016	0.0066	51.49	8.71	2.164		1.898
R Squared		0.999	0.0099	50.28	7.50	2.015		1.898
No. of Observations		61	0.0133	49.40	6.62	1.890 *		1.897
Degrees of Freedom		59	0.0166	49.16	6.38	1.853 *		1.897
			0.0200	49.29	6.51	1.873 +		1.896
X Coefficient(s)	-0.1659		0.0233	49.46	6.68	1.899 *		1.896
Std Err of Coef.	0.0007		0.0266	49.63	6.85	1.924 *		1.895
			0.0300	49.70	6.92	1.934 *		1.894
			0.0333	49.68	6.90	1.932 *		1.894
			0.0500	49.55	6.77	1.913 *		1.891
			0.0666	49.54	6.76	1.911 *		1.888
			0.0833	49.49	6.71	1.904 *		1.886

VE	LL B16A	•		Natural Log	
T;	me (min	to ) Water	Change	Water Level Change	LINE
''			cnarge	Charge	CALC.
	0.1000		6.70	1.902 *	1.883
	0.1166		6.66	1.896 *	1.880
	0.1333		6.63	1.892 *	1.877
	0.1500		6.60	1.887 *	1.875
	0.1666	49.37	6.59	1.886 *	1.872
	0.1833		6.55	1.879 *	1.869
	0.2000		6.54	1.878 *	1.866
	0.2166		6.51	1.873 *	1.864
	0.2333		6.49	1.870 *	1.861
	0.2500		6.46	1.866 *	1.858
	0.2666 0.2833		6.44 6.41	1.863 * 1.858 *	1.855
	0.3000		6.40	1.856 *	1.852 1.850
	0.3166		6.36	1.850 *	1.847
	0.3333		6.35	1.848 *	1.844
	0.4167		6.24	1.831 *	1.830
	0.5000	48.92	6.14	1.815 +	1.817
	0.5833	48.81	6.03	1.797 *	1.803
	0.6667	48.72	5.94	1.782 *	1.789
•	0.7500	48.64	5.86	1.768 *	1.775
	0.8333	48.55	5.77	1.753 *	1.761
	0.9167	48.47	5.69	1.739 *	1.747
	1.0000	48.37	5.59	1.721 *	1.734
	1.0833	48.31	5.53	1.710 *	1.720
	1.1670 1.2500	48.23 48.15	5.45 5.37	1.696 * 1.681 *	1.706
	1.3333	48.07	5.29	1.666 *	1.692 1.67 <b>8</b>
	1.4166	48.00	5.22	1.652 *	1.664
	1.5000	47.92	5.14	1.637 *	1.651
	1.5833	47.85	5.07	1.623 *	1.637
	1.6667	47.78	5.00	1.609 *	1.623
	1.7500	47.70	4.92	1.593 *	1.609
	1.8333	47.63	4.85	1.579 *	1.595
	1.9167	47.55	4.77	1.562 *	1.581
	2.0000	47.49	4.71	1.550 *	1.568
	2.5000	47.11	4.33	1.466	1.485
	3.0000	46.75	3.97	1.379	1.402
	3.5000 4.0000	46.45 46.17	3.67 3.39	1.300 1.221	1.319 1.236
	4.5000	45.90	3.12	1.138	1.153
	5.0000	45.67	2.89	1.061	1.070
	5.5000	45.45	2.67	0.962	0.987
·	6.0000	45.24	2.46	0.900	0.904
	6.5000	45.05	2.27	0.820	0.821
	7.0000	44.88	2.10	0.742	0.738
	7.5000	44.72	1.94	0.663	0.655
	8.0000	44.56	1.78	0.577	0.572
	8.5000	44.42	1.64	0.495	0.489
	9.0000	44.30	1.52	0.419	0.406
	9.5000 0.0000	44.19 44.08	1.41 1.30	0.344 0.262	0.32 <b>3</b> 0.240
	2.0000	43.70	0.92	-0.083	-0.091
	4.0000	43.41	4.76		-0.423
	6.0000	43.23			-0.755
	8.0000	43.07			-1.087
	0.0000	42.96			-1.418
	2.0000	42.88			-1.750
2	4.0000	42.82			-2.082

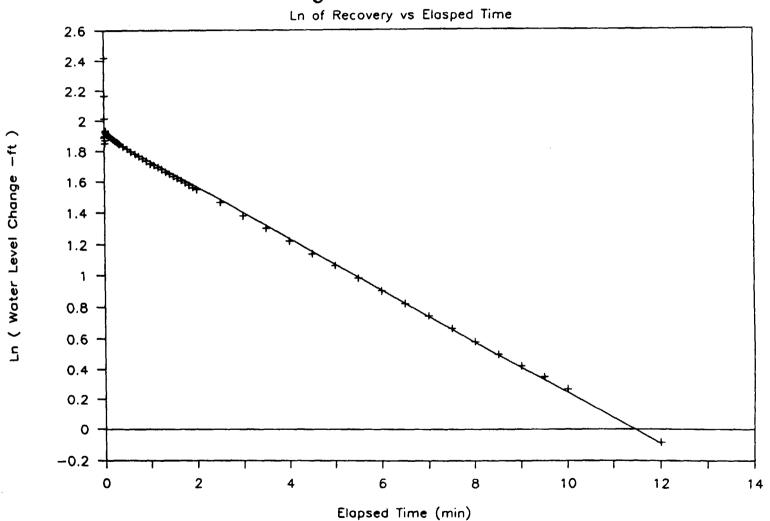
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# Slug Test at B16



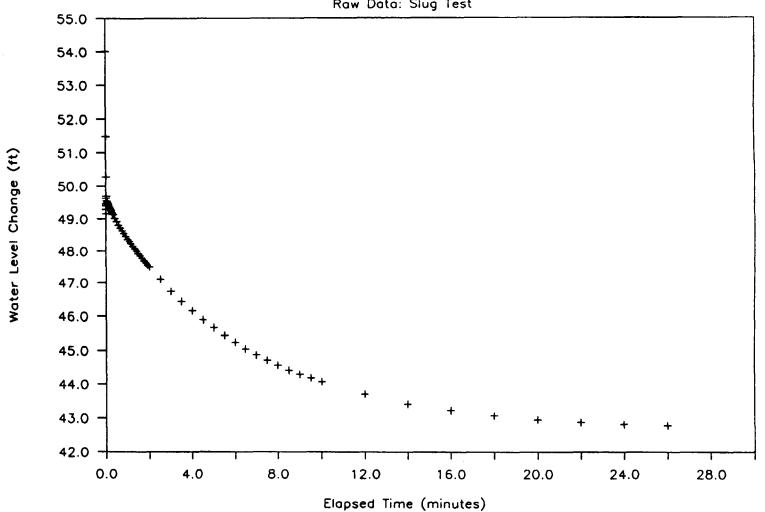


# Slug Test for B16A Ln of Recovery vs Elasped Time



# Slug Test at B16A

Raw Data: Slug Test

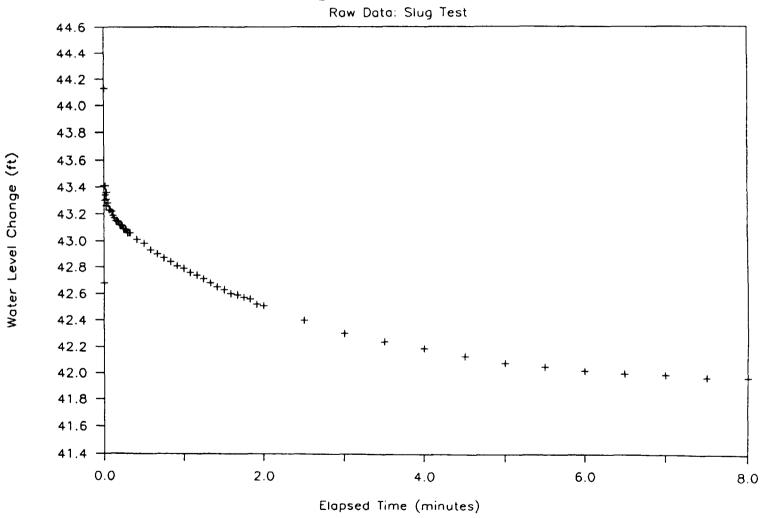


SLUG TEST RESULTS FOR: G109
Winnebago Reclamation Landfill

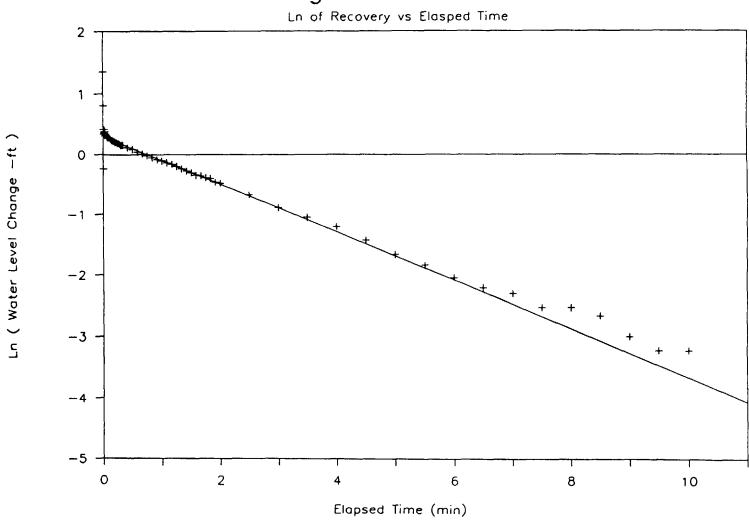
WELL INFORMATION								
Casing Diameter (in		•••••		2	• • • • • • • • • •		• • • • • • • • • • •	
Effective Casing RA	-	56)		1.28				
Screen Diameter (in		10)		2.0				
Effective RADIUS (in				1.89				
Screen Length (ft)(				10.0				
•	-			200.0				
Aquifer Thickness (				11.58				
Well Penetration (f	t)(M) 			11.20				
CALCULATED PARAMETER	RS							
i / rw			• • • • • • • • • • •	63.5	********		•••••	
A .				3.4				
8				0.55				
C				NA				
ln ((D-h)/rw)				7.09				
In (Re / rw) fully (	Donateatin			NA				
In (Re / rw)Partial				2.70				
In (Re / rw)Partial	-	-		2.77				
1/t * ln (Yo /Yt)	ty renetia	ting(>0	,	0.40				
•••••								
RESULTS				FT/HIN	FT/DAY	GPD/SQ.FT	CM/SEC	
Hydraulic Conductiv				NA.	NA	NA NA	NA.	• • • • • • •
Hydraulic Conductiv						6.54E+00		
Hydraulic Conductiv				6.23E-04		6.71E+00	3.16E-04	
mydrautic conductiv			, 		0.976-01	• • • • • • • • • • • • • • • • • • • •		
				SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully		•••••		NA	NA	NA.	NA	• • • • • • •
Transmissivity Part				1.21E-01	174.7	1307.0	1.88E-04	
Transmissivity Part				1.25E-01	179.3		1.93E-04	
			· · · · · · · · · · · ·				• • • • • • • • • • • • • • • • • • • •	
				Depth	Water	Natural Log	of	REGR
				to	level	Water Level		LINE
			Time (min)		Change	•		CALC.
Paggagaian	Outmake a		0.0000	45.74	3.85	1.348	•	0.295
Regression Constant	output:	0.295	0.0033	42.68	0.79			0.293
Std Err of Y Est		0.293	0.0055	43.41	1.52			0.292
		0.995	0.0099	44.13	2.24	0.806		0.292
R Squared								
No. of Observations		38	0.0133	43.30	1.41	0.344 0.372		0.289
Degrees of Freedom		36	0.0166	43.34	1.45			0.288
V 6-4414144-4	0.7054		0.0200	43.41	1.52	0.419		0.287
X Coefficient(s)	-0.3956		0.0233	43.36	1.47			0.285
Std Err of Coef.	0.0045		0.0266	43.26	1.37			0.284
			0.0300	43.31	1.42			0.283
			0.0333	43.36	1.47			0.281
			0.0500	43.28	1.39	0.329 *		0.275
			0.0666	43.23	1.34	0.293 *		0.268
			0.0833	43.23	1.34	0.293 *		0.262

WELL G109	Depth		Natural Log o	f REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	43.22	1.33	0.285 *	0.255
0.1166	43.19	1.30	0.262 *	0.248
0.1333	43.17	1.28	0.247 *	0.242
0.1500	43.15	1.26	0.231 *	0.235
0.1666	43.15	1.26	0.231 *	0.229
0.1833	43.14	1.25	0.223 *	0.222
0.2000 0.2166	43.12 43.12	1.23	0.207 *	0.215 0.209
0.2333	43.12	1.23 1.22	0.207 <b>*</b> 0.199 <b>*</b>	0.202
0.2500	43.09	1.20	0.197 *	0.196
0.2666	43.09	1.20	0.182 *	0.189
0.2833	43.08	1.19	0.174 *	0.182
0.3000	43.06	1.17	0.157 *	0.176
0.3166	43.06	1.17	0.157 *	0.169
0.3333	43.06	1.17	0.157 *	0.163
0.4167	43.01	1.12	0.113 *	0.130
0.5000	42.98	1.09	0.086 *	0.097
0.5833	42.93	1.04	0.039 *	0.064
0.6667	42.90	1.01	0.010 *	0.031
0.7500	42.87	0.98	-0.020 *	-0.002
0.8333	42.84	0.95	-0.051 *	-0.035
0.9167	42.81	0.92	-0.083 *	-0.068
1.0000	42.79	0.90	-0.105 *	-0.101
1.0833	42.76	0.87	-0.139 *	-0.134
1.1670	42.74	0.85	-0.163 *	-0.167
1.2500	42.71	0.82	-0.198 *	-0.200
1.3333	42.68	0.79	-0.236 *	-0.233
1.4166	42.65	0.76	-0.274 *	-0.266
1.5000	42.63	0.74	-0.301 *	-0.299
1.5833	42.60	0.71	-0.342 *	-0.332
1.6667	42.59	0.70 0.68	-0.357 *	-0.365 -0.398
1. <i>7</i> 500 1.8333	42.57	0.67	-0.386 <b>*</b> -0.400 <b>*</b>	-0.431
1.9167	42.56 42.52	0.63	-0.462 *	-0.464
2.0000	42.51	0.62	-0.478 *	-0.497
2.5000	42.40	0.51	-0.673	-0.694
3.0000	42.30	0.41	-0.892	-0.892
3.5000	42.24	0.35	-1.050	-1.090
4.0000	42.19	0.30	-1.204	-1.288
4.5000	42.13	0.24	-1.427	-1.486
5.0000	42.08	0.19	-1.661	-1.683
5.5000	42.05	0.16	-1.833	-1.881
6.0000	42.02	0.13	-2.040	-2.079
6.5000	42.00	0.11	-2.207	-2.277
7.0000	41.99	0.10	-2.303	-2.475
7.5000	41.97	0.08	-2.526	-2.672
8.0000	41.97	0.08	-2.526	-2.870
8.5000	41.96	0.07	-2.659	-3.068
9.0000	41.94	0.05	-2.996	-3.266
9.5000	41.93	0.04	-3.219	-3.464
10.0000	41.93	0.04	-3.219	-3.661

Slug Test at G109



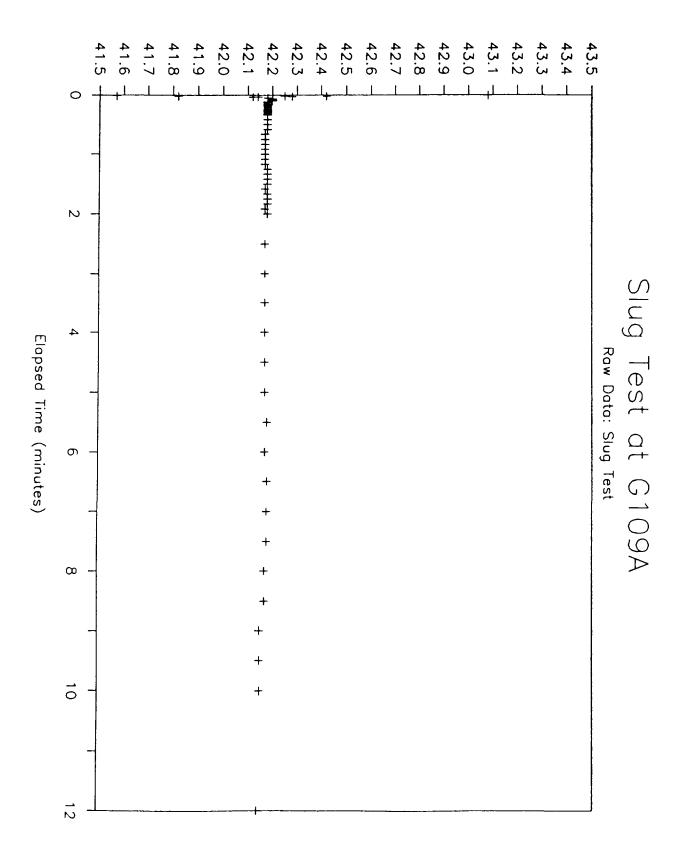
Slug Test for G109



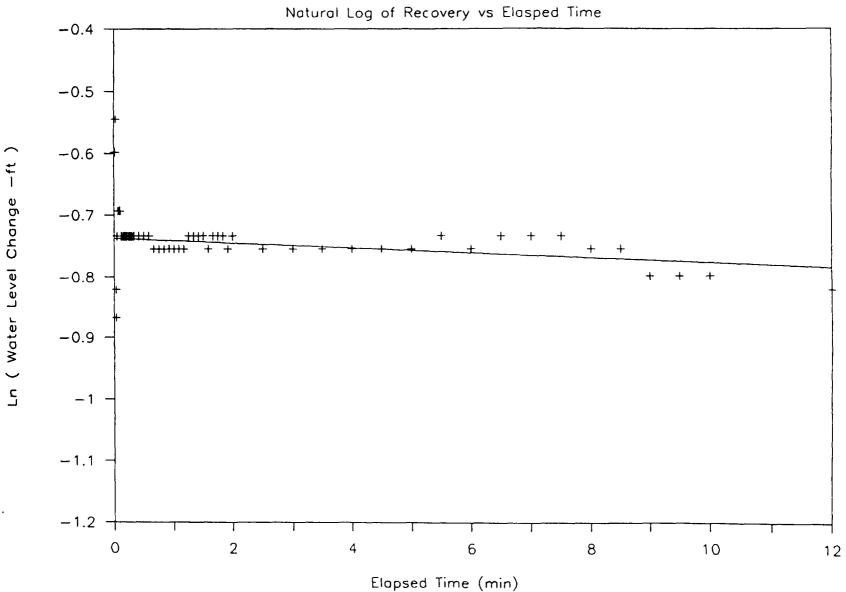
#### BAILDOWN TEST RESULTS FOR: G109A Winnebago Reclamation Landfill

WELL INFORMATION							
Casing Diameter (in) Effective Casing RADIUS (in)(rc) Screen Diameter (in)			2 1.00 2.0				
Effective RADIUS (in)(rw)			1.89 5.0				
Screen Length (ft)(L) Aquifer Thickness (ft)(D)			200.0				
Well Penetration (ft)(H)			39.26				
CALCULATED PARAMETERS							
Ł/rw			31.7				
A			2.5				
8			0.40				
С			NA				
ln ((D-h)/rw)			6.93				
<pre>In (Re / rw) Fully Penetrating</pre>			NA				
In (Re / rw)Partially Penetrating			2.75				
In (Re / rw)Partially Penetrating	(>6)		2.84				
1/t * ln (Yo /Yt)			0.00				
RESULTS			FT/MIN	FT/DAY	GPD/SQ.FT		
Hydraulic Conductivity Fully-P			NA.	NA.		NA.	
Hydraulic Conductivity Partial-P					8.20E-02		
Hydraulic Conductivity Partial-P			7.87E-06		8.48E-02		
***************************************						_	
***************************************			SQ.FT/HIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully-P			NA	NA		NA	
Transmissivity Partial-P			1.52E-03				
Transmissivity Partial-P (>6)			1.57E-03	2.3			
		G109A			Natural Log		REGR
			to	level	Water Level		LINE
		(min)		Change	Change		CALC.
Banasaian Gubruba		.0000	9.42	-32.28			-0.737
Regression Output: Constant -0.		.0033	10.98	-32.26			-0.737
		.0066	44.25	2.55			-0.738
		.0099	43.08	1.38			-0.738
No. of Observations		.0133	41.57	-0.13	ERR		-0.738
Degrees of Freedom		.0166	41.82	0.12			-0.738
	-	.0200	42.25	0.55	-0.598		-0.738
X Coefficient(s) -0.0040		.0233	42.42	0.72	-0.329		-0.738
Std Err of Coef. 0.0011	-	.0266	42.28	0.58			-0.738
		.0300	42.12	0.42			-0.738
	0	.0333	42.14	0.44	-0.821 *		-0.738
	0	.0500	42.18	0.48	-0.734 *		-0.738
	0	.0666	42.2	0.50	-0.693 *		-0.738
	0	.0833	42.2	0.50	-0.693 *		-0.738

Well G109A	Depth	Water	Natural Log	of REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
•••••		• • • • • • •	•••••	******
0.1000	42.2	0.50	-0.693 *	-0 <b>.738</b>
0.1166	42.18	0.48	-0.734 *	-0.738
0.1333	42.18	0.48	-0.734 *	-0.738
0.1500	42.18	0.48	-0.734 *	-0.738
0.1666	42.18	0.48	-0.734 *	-0.738
0.1833	42.18	0.48	-0.734 *	-0.738
0.2000	42.18	0.48	-0.734 *	-0.738
0.2166	42.18	0.48	-0.734 *	-0. <i>7</i> 38
0.2333	42.18	0.48	-0.734 *	-0.738
0.2500	42.18	0.48	-0.734 *	-0.738
0.2666	42.18	0.48	-0.734 *	-0.739
0.2833	42.18	0.48	-0.734 *	-0.739
0.3000	42.18	0.48	-0.734 *	-0.739
0.3166	42.18	0.48	-0.734 *	-0 <i>.7</i> 39
0.3333	42.18	0.48	-0.734 *	-0.739
0.4167	42.18	0.48	-0.734 *	-0.739
0.5000	42.18	0.48	-0.734 *	-0.739
0.5833	42.18	0.48	-0.734 *	-0.740
0.6667	42.17	0.47	-0.755 <b>*</b>	-0.740
0.7500	42.17	0.47	-0.755 *	-0.740
0.8333	42.17	0.47	-0.755 *	-0.741
0.9167	42.17	0.47	-0.755 *	-0.741
1.0000	42.17	0.47	-0.755 *	-0.741
1.0833	42.17	0.47	-0.755 *	-0.742
1.1670	42.17	0.47	-0.755 *	-0.742
1.2500	42.18	0.48	-0.734 *	-0.742
1.3333	42.18	0.48	-0.734 *	-0.743
1.4166	42.18	0.48	-0.734 *	-0.743
1.5000	42.18	0.48	-0.734 *	-0.743
1.5833	42.17	0.47	-0.755 *	-0.744
1.6667	42.18	0.48	-0.734 *	-0.744
1.7500	42.18	0.48	-0.734 *	-0.744
1.8333	42.18	0.48	-0.734	-0.745
1.9167	42.17	0.47	-0.755 *	-0.745
2.0000	42.18	0.48	-0.734 *	-0.745
2.5000	42.17	0.47	-0.755 *	-0.747
3.0000 3.5000	42.17 42.17	0.47 0.47	-0.755 *	-0.749
4.0000	42.17	0.47	-0.755 * -0.755 *	-0.751
4.5000	42.17	0.47	-0.755 *	-0.75 <b>3</b> -0.755
5.0000	42.17	0.47	-0.755 *	-0.757
5.5000	42.18	0.48	-0.734 *	-0.759
6.0000	42.17	0.47	-0.755 *	-0.761
6.5000	42.18	0.48	-0.734 *	-0.763
7.0000	42.18	0.48	-0.734 *	-0.765
7.5000	42.18	0.48	-0.734 *	-0.767
8.0000	42.17	0.47	-0.755 *	-0.769
8.5000	42.17	0.47	-0.755 *	-0.771
9.0000	42.15	0.45	-0.799 *	-0.773
9.5000	42.15	0.45	-0.799 *	-0.775
10.0000	42.15	0.45	-0.799 *	-0.777
12.0000	42.14	0.44	-0.821 *	-0.785



Slug Test for G109A

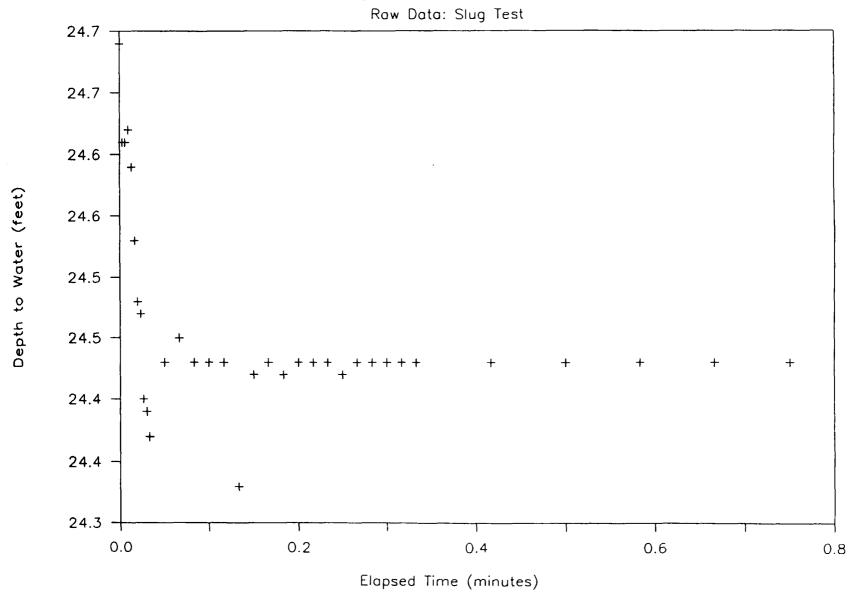


SLUG TEST RESULTS FOR: G111
Winnebago Reclamation Landfill

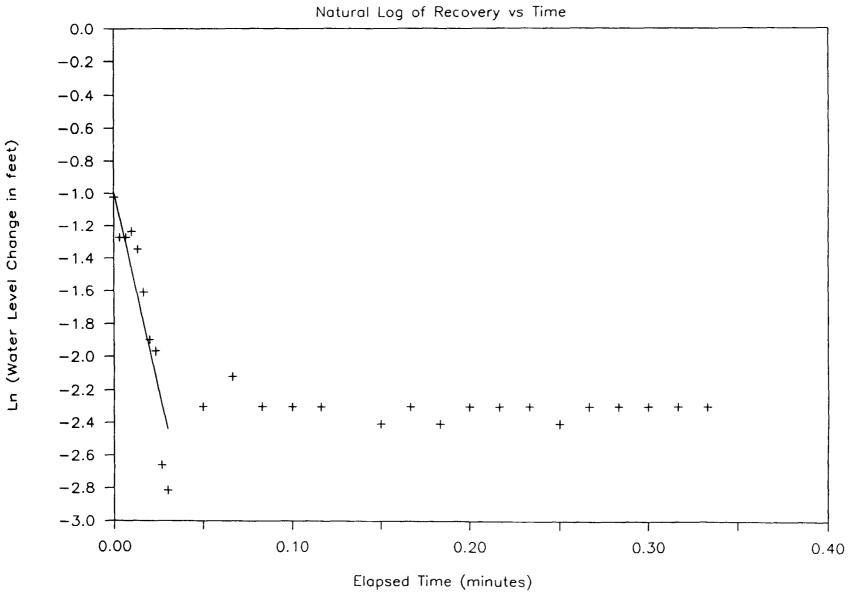
WELL INFORMATION							
Casing Diameter (in)			2				
Effective Casing RADIUS (in	)(rc)		1.00				
Screen Diameter (in)			2.0				
Effective RADIUS (in)(rw)			1.89				
Screen Length (ft)(L)			10.00				
Aquifer Thickness (ft)(D)			200.0				
Well Penetration (ft)(H)			13.66			<b></b>	
CALCULATED PARAMETERS							
L / rw		••••••	63.5				
A			3.40				
В			0.60				
C			NA				
ln ((D-h)/rw)			7.08				
in (Re / rw) Fully Penetrat	ing		NA				
In (Re / rw)Partially Penet	rating		2.73				
ln (Re / rw)Partially Penet	rating(>6)	)	2.80				
1/t * ln (Yo /Yt)			48.40				
RESULTS			FT/MIN	-	GPD/SQ.FT		
Hydraulic Conductivity Full			NA NA	NA	NA	NA NA	
Hydraulic Conductivity Part					4.93E+02		
Hydraulic Conductivity Part			4.71E-02		5.07E+02		
•••••				SQ.FT/DAY	GPD/FT		
Transmissivity Fully-P			NA	NA		NA	
Transmissivity Partial-P			9.16E+00		98656.3	1.42E-02	
Transmissivity Partial-P (>	6)				101468.1		
***************************************							
			Depth		Natural Log		REGR
		Time (min)	to Water		Water Level Change		LINE CALC.
		111RE (11111)	Marei		change		
Regression Output:		0.0000	24.69	0.36	-1.022		-0.830
Constant	-0.830	0.0033	24.61	0.28	-1.2 <b>73</b>		-0.990
Std Err of Y Est	0.125	0.0066	24.61	0.28	-1.273		-1.150
R Squared	0.849	0.0099	24.62	0.29	-1.238 *		-1.309
No. of Observations	5	0.0133	24.59	0.26	-1.347 *		-1.474
Degrees of Freedom	3	0.0166	24.53	0.20	-1.609 *		-1.634
		0.0200	24.48	0.15			-1.798
X Coefficient(s) -48.3970		0.0233	24.47	0.14	-1.966 *		-1.958
Std Err of Coef. 11.7875	1	0.0266	24.40	0.07	-2.659 *		-2.118
		0.0300	24.39	0.06	-2.813 *		-2.282
		0.0333	24.37	0.04	-3.219		-2.442
		0.0500	24.43	0.10	-2.303 -2.120		-3.250 -4.053
		0.0666 0.0833	24.45 24.43	0.12 0.10	-2.120		-4.862
		0.0033	24.43	0.10	-2.303		4.002

Well G111	Depth		Natural Log of	REGR
	to		Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	24.43	0.10	-2.303	-5.670
0.1166	24.43	0.10	-2.303	-6.473
0.1333	24.33	0.00	ERR	
0.1500	24.42	0.09	-2.408	
0.1666	24.43	0.10	-2.303	
0.1833	24.42	0.09	-2.408	
0.2000	24.43	0.10	-2.303	
0.2166	24.43	0.10	-2.303	
0.2333	24.43	0.10	-2.303	
0.2500	24.42	0.09	-2.408	
0.2666	24.43	0.10	-2.303	
0.2833	24.43	0.10	-2.303	
0.3000	24.43	0.10	-2.303	
0.3166	24.43	0.10	-2.303	
0.3333	24.43	0.10	-2.303	
0.4167	24.43	0.10	-2.303	
0.5000	24.43	0.10	-2.303	
0.5833	24.43	0.10	-2.303	
0.6667	24.43	0.10	-2.303	
0.7500	24.43	0.10	-2.303	
0.8333	24.45	0.12	-2.120	
0.9167	24.45	0.12	-2.120	
1.0000	24.45	0.12	-2.120	
1.0833	24.45	0.12	-2.120	
1.1670	24.45	0.12	-2.120	
1.2500	24.45	0.12	-2.120	
1.3333	24.45	0.12	-2.120	
1.4166	24.45	0.12	-2.120	
1.5000	24.45	0.12	-2.120	
1.5833	24.45	0.12	-2.120	
1.6667	24.45	0.12	-2.120	
1.7500	24.45	0.12	-2.120	
1.8333	24.45	0.12	-2.120	
1.9167	24.45	0.12	-2.120	
2.0000	24.45	0.12	-2.120	
2.5000	24.45	0.12	-2.120	
3.0000	24.47	0.14	-1.966	
3.5000	24.47	0.14	-1.966	
4.0000	24.45	0.12	-2.120	
4.5000	24.45	0.12	-2.120	
5.0000	24.45	0.12	-2.120	
5.5000	24.47	0.14	-1.966	
6.0000 6.5000	24.47 24.47	0.14	-1.966 -1.966	
0.5000	24.41	0.14	-1.966	

Slug Test at G111



Slug Test at G111

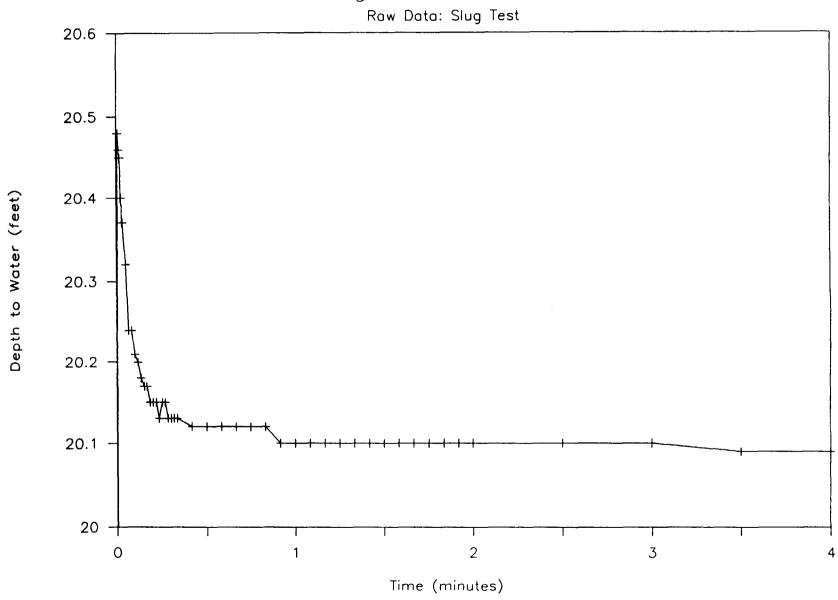


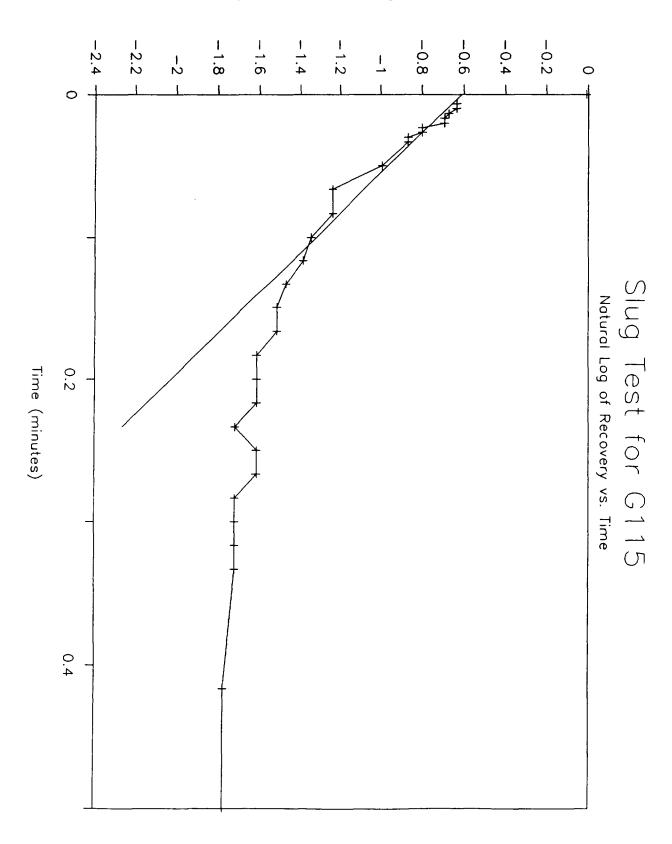
### BAILDOWN TEST RESULTS FOR: G115 Winnebago Reclamation Landfill

WELL INFORMATION						•••••	
Casing Diameter (in) Effective Casing RADIUS	(in)(rc)		2 1.2 <b>8</b>				
Screen Diameter (in)			2.0				
Effective RADIUS (in)(rw)	)		1.89				
Screen Length (ft)(L)	_		3.04				
Aquifer Thickness (ft)(D)	)		200.0				
Well Penetration (ft)(H)			3.04		_		
CALCULATED PARAMETERS					• • • • • • • • • • • • • • • • • • • •		
L / rw			19.3				
A .			2.10				
8			0.35				
c			NA				
ln ((D-h)/rw)			7.13				
In (Re / rw) Fully Penets	rating		NA				
In (Re / rw)Partially Per	-		1.64				
In (Re / rw)Partially Per	-		1.70				
1/t * ln (Yo /Yt)			7.08				
RESULTS			FT/MIN	•	GPD/SQ.FT		
Hydraulic Conductivity Fu	•		NA 2.17E-02		NA 2.34E+02	NA 1 105-03	
Hydraulic Conductivity Pa			2.17E-02		2.42E+02		
Hydraulic Conductivity Pa	artial-P (20)				2.426+02		
		•	SQ.FT/MIN	SQ.FT/DAY		SQ.M/SEC	
Transmissivity Fully-P			NA	NA			
Transmissivity Partial-P			4.34E+00		46795.5		
Transmissivity Partial-P			4.50E+00	6474.6	48424.8	6.96E-03	
	••••••		Depth		Natural Log		REGR
			to	level	Water Level		LINE
	•	Time (min)	Water	Change	•		CALC.
Regression Outpu	ut:	0.0000	20.94	0.99	-0.010		-0.611
Constant	-0.611	0.0033	19.44	-0.51	ERR		-0.635
Std Err of Y Est	0.061	0.0066	20.48	0.53	-0.635 *	•	-0.658
R Squared	0.961	0.0099	20.48	0.53	-0.635 *	•	-0.682
No. of Observations	15	0.0133	20.46	0.51	-0.673 *	•	-0.706
Degrees of Freedom	13	0.0166	20.45	0.50	-0.693 *	,	-0.729
-		0.0200	20.45	0.50	-0.693 *	1	-0.753
X Coefficient(s) -7.07	783	0.0233	20.40	0.45	-0.799 *	1	-0.776
Std Err of Coef. 0.39	731	0.0266	20.40	0.45	-0.799 *	•	-0.800
		0.0300	20.37	0.42	-0.868 *	,	-0.824
		0.0333	20.37	0.42	-0.868 *	•	-0.847
		0.0500	20.32	0.37	-0.994 *	•	-0.965
		0.0666	20.24	0.29	-1.238 *		-1.083
		0.0833	20.24	0.29	-1.238 *		-1.201

	Depth	Water	Natural Log of	REGR
Time (-i-)	to		Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	20.21	0.26	-1.347 *	-1.319
0.1166	20.20	0.25	-1.386 *	-1.437
0.1333	20.18	0.23	-1.470 *	-1.555
0.1500	20.17	0.22	-1.514 *	-1.673
0.1666	20.17	0.22	-1.514 *	-1.791
0.1833	20.15	0.20	-1.609 *	-1.909
0.2000	20.15	0.20	-1.609	-2.027
0.2166	20.15	0.20	-1.609	-2.145
0.2333	20.13	0.18	-1.715	-2.263
0.2500	20.15	0.20	-1.609	-2.381
0.2666	20.15	0.20	-1.609	-2.499
0.2833	20.13	0.18	-1.715	-2.617
0.3000	20.13	0 <b>.18</b>	-1.715	-2. <b>73</b> 5
0.3166	20.13	0.18	-1.715	-2.852
0.3333	20.13	0.18	-1.715	-2.971
0.4167	20.12	0.17	-1.772	-3.561
0.5000	20.12	0.17	-1.772	-4.151
0.5833	20.12	0.17	-1.772	-4.740
0.6667	20.12	0.17	-1.772	-5.331
0.7500	20.12	0.17	-1.772	-5.920
0.8333	20.12	0.17	-1.772	-6.510
0.9167	20.10	0.15	-1.897	-7.100
1.0000	20.10	0.15	-1.897	-7.690
1.0833	20.10	0.15	-1.897	-8.279
1.1670	20.10	0.15	-1.897	-8.872
1.2500	20.10	0.15	-1.897	-9.459
1.3333 1.4166	20.10	0.15	-1.897	-10.049
1.5000	20.10	0.15	-1.897	-10.639
1.5833	20.10	0.15	-1.897	-11.229
1.6667	20.10 20.10	0.15	-1.897	-11.818
1.7500	20.10	0.15 0.15	-1.897 -1.897	-12.409
1.8333	20.10	0.15	-1.897	-12.998
1.9167	20.10	0.15	-1.897	-13.588
2.0000	20.10	0.15	-1.897	-14.178
2.5000	20.10	0.15	-1.897	-14.768
3.0000	20.10	0.15	-1.897	-18.307 -21.846
3.5000	20.09	0.14	-1.966	-25.385
4.0000	20.09	0.14	-1.966	-28.925
4.5000	20.09	0.14	-1.966	-32.464
5.0000	20.09	0.14	-1.966	-36.003
5.5000	20.09	0.14	-1.966	-39.542
6.0000	20.09	0.14	-1.966	-43.081
6.5000	20.09	0.14	-1.966	-46.620
7.0000	20.10	0.15	-1.897	-50.159
7.5000	20.09	0.14	-1.966	-53.699
8.0000	20.10	0.15	-1.897	-57.238
8.5000	20.10	0.15	-1.897	-60.777
9.0000	20.09	0.14	-1.966	-64.316
9.5000	20.09	0.14	-1.966	-67.855
10.0000	20.09	0.14	-1.966	-71.394

Slug Test at G115



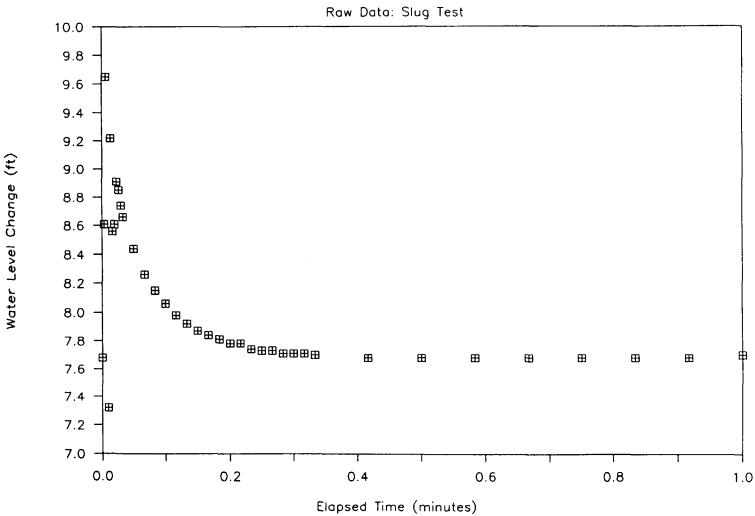


## SLUG TEST RESULTS FOR: G116 Winnebago Reclamation Landfill

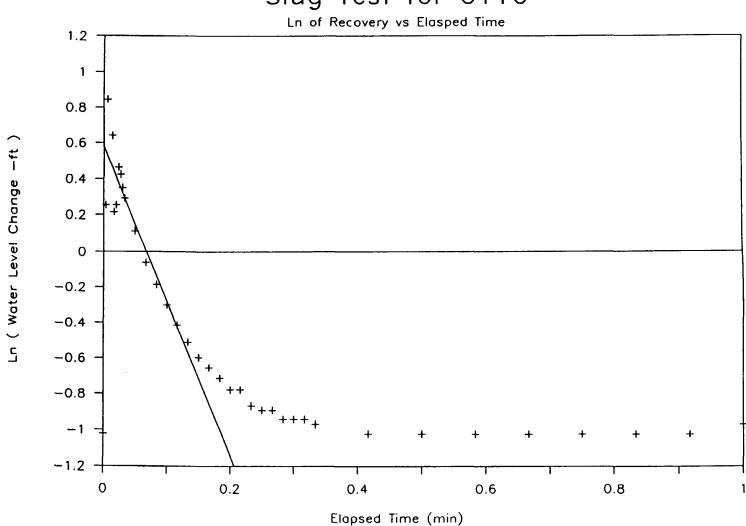
WELL INFORMATION							•	
Casing Diameter (in)	)			2				
Effective Casing RAD	IUS (in)(ro	:)		1.28				
Screen Diameter (in)	)			2.0				
Effective RADIUS (in	1)(rw)			1.89				
Screen Length (ft)(L	.)			8.58				
Aquifer Thickness (f	t)(D)			200.0				
Well Penetration (ft	:)(H)			8.58				
••••••		•••••					• • • • • • • • • • • • • • • • • • • •	
CALCULATED PARAMETER	:S							
L / rw				54.5		• • • • • • • • • • • • • • • • • • • •		
L / IW				3.15				
B				0.50				
C				NA				
ln ((D-h)/rw)				7.10				
In (Re / rw) Fully P	enetrating			NA.				
In (Re / rw)Partiall		na		2.51				
In (Re / rw)Partiall	-	_	1	2.58				
1/t * ln (Yo /Yt)	,		•	8.63				
RESULTS				FT/MIN	FT/DAY	GPD/SQ.FT	CM/SEC	
Widowillo Condinativi	and Full band					 NA		
Hydraulic Conductivi Hydraulic Conductivi	•	. D		NA 1.44E-02	NA 2.07€±01	NA 1.55E+02	NA 7.30E-03	
Hydraulic Conductivi	•			1.47E-02		1.59E+02		
", ar aut re conduct re			, 		••••••			
			;	SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully	_{/-} р			NA	NA	NA	NA	
Transmissivity Parti				2.87E+00	4138.0	30948.8	4.45E-03	
Transmissivity Parti				2.95E+00	4245.9	31756.1	4.56E-03	
			WELL G116	Depth		Natural Log		REGR
				to		Water Level		LINE
			Time (min)	Water	Change	Change		CALC.
Regression	Output:		0.0000	7.68	0.36			0.580
Constant	•	0.580	0.0033	8.61	1.29	0.255		0.552
Std Err of Y Est		0.098	0.0066	9.65	2.33	0.846		0.523
R Squared		0.524	0.0099	7.32	0.00	ERR		0.495
No. of Observations		6	0.0133	9.22	1.90	0.642		0.465
Degrees of Freedom		4	0.0166	8.56	1.24	0.215 *		0.437
			0.0200	8.61	1.29	0.255 *		0.408
X Coefficient(s)	-8.6283		0.0233	8.91	1.59	0.464 *		0.379
Std Err of Coef.	4.1110		0.0266	8.85	1.53	0.425 *		0.351
			0.0300	8.74	1.42	0.351 *		0.321
			0.0333	8.66	1.34	0.293 *		0.293
			0.0500	8.44	1.12	0.113 *		0.149
			0.0666	8.26	0.94	-0.062		0.006
			0.0833	8.15	0.83	-0.186		-0.139

WELL G116	Depth		Natural Log of	REGR
	to		Water Level	LINE
Time (min)	Water	Change	Change	CALC.
0.1000	8.06	0.74	-0.301	-0.283
0.1166	7.98	0.66	-0.416	-0.426
0.1333	7.92	0.60	-0.511	-0.570
0.1500	7.87	0.55	-0.598	-0.714
0.1666	7.84	0.52	-0.654	-0.857
0.1833	7.81	0.49	-0.713	-1.001
0.2000	7.78	0.46	-0.777	-1.145
0.2166	7.78	0.46	-0.777	-1.289
0.2333	7.74	0.42	-0.868	-1.433
0.2500	7.73	0.41	-0.892	-1.577
0.2666	7.73	0.41	-0.892	-1.720
0.2833	7.71	0.39	-0.942	-1.864
0.3000	7.71	0.39	-0.942	-2.008
0.3166	7.71	0.39	-0.942	-2.152
` 0.3333	7.7	0.38	-0.968	-2.296
0.4167	7.68	0.36	-1.022	-3.015
0.5000	7.68	0.36	-1.022	-3.734
0.5833	7.68	0.36	-1.022	-4.453
0.6667	7.68	0.36	-1.022	-5.172
0.7500	7.68	0.36	-1.022	-5.891
0.8333	7.68	0.36	-1.022	-6.610
0.9167	7.68	0.36	-1.022	-7.329
1.0000	7.7	0.38	-0 <b>.968</b>	-8.048
1.0833	7.7	0.38	-0.968	-8.767
1.1670	7.7	0.38	-0. <del>968</del>	-9.489
1.2500	7.7	0.38	-0.968	-10.205
1.3333	7.7	0.38	-0.968	-10.924
1.4166	7.7	0.38	-0.968	-11.643
1.5000	7.7	0.38	-0.968	-12.362
1.5833	7.7	0.38	-0.968	-13.081
1.6667	7.7	0.38	-0.968	-13.801
1.7500	7.7	0.38	-0.968	-14.519
1.8333	7.7	0.38	-0.968	-15.238
1.9167	7.7	0.38	-0.968	-15.958
2.0000	7.68	0.36	-1.022	-16.676
2.5000	7.68	0.36	-1.022	-20.991
3.0000	7.68	0.36	-1.022	-25.305
3.5000	7.68	0.36	-1.022	-29.619
4.0000	7.68	0.36	-1.022	-33.933

## Slug Test at G116



## Slug Test for G116

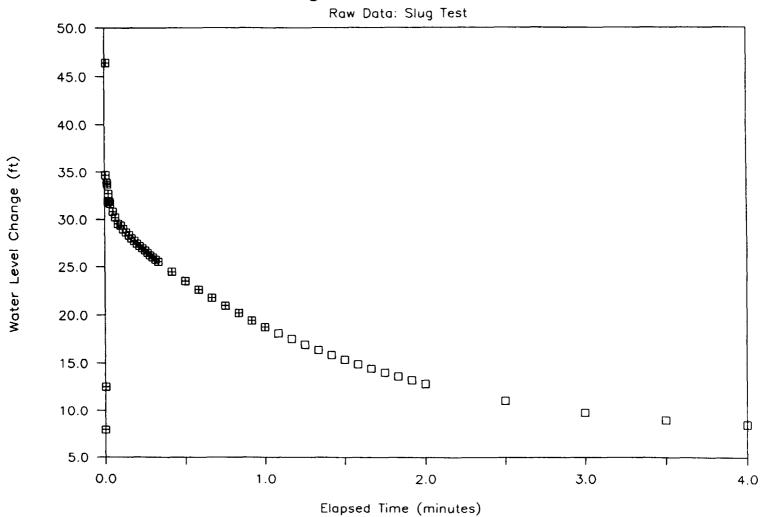


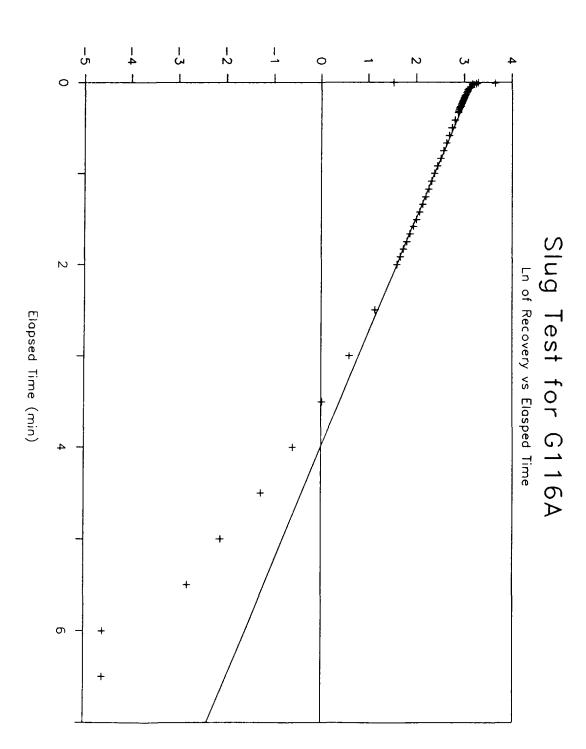
## SLUG TEST RESULTS FOR: G116A Winnebago Reclamation Landfill

WELL INFORMATION								
Casing Diameter (in				·········· 2	•			••••••
Effective Casing RA	-	rc)		1.00				
Screen Diameter (in		, ,		2.0				
Effective RADIUS (i	•			1.89				
Screen Length (ft)(				5.00				
Aquifer Thickness (	•			200.0				
Well Penetration (f				37.40				
CALCULATED PARAMETE	RS	• • • • • •		********				
L / rw				31.7				
A .				2.45				
В				0.40				
Č				NA				
ln ((D-h)/rw)				6.94				
In (Re / rw) Fully	Penetratin	3		NA				
In (Re / rw)Partial	-	-		2.73				
In (Re / rw)Partial	•	_	)	2.83				
1/t * (n (Yo /Yt)	.,		•	0.80				
				••••••				
RESULTS				FT/MIN	FT/DAY	GPD/SQ.FT	CM/SEC	
Hydraulic Conductiv				NA NA	NA		NA	
Hydraulic Conductiv						1.63E+01	7.69E-04	
Hydraulic Conductiv				1.56E-03	2.25E+00	1.68E+01	7.95E-04	
				SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	••••••
Transmissivity Full	••••••••••••••••••••••••••••••••••••••	• • • • • • • •		NA	NA	NA	NA.	
Transmissivity Part	•			3.03E-01		3260.4		
Transmissivity Part				3.13E-01	450.5	3369.5	4.84E-04	
				Depth		Natural Log		REGR
				to		Water Level		LINE
			Time (min)	Water	Change			CALC.
Regression	Output:	7 404	0.0000	7.92	0.00			3.181
Constant		3.181	0.0033	12.50	4.58			3.178
Std Err of Y Est		0.080	0.0066	34.69	26.77			3.175
R Squared		0.975	0.0099	46.41	38.49			3.173
No. of Observations		46	0.0133	33.86	25.94	3.256 *		3.170
Degrees of Freedom		44	0.0166	33.69	25.77			3.167
X Coefficient(s)	-0.7971		0.0200	31.80 32.71	23.88 24.79			3.165 3.162
Std Err of Coef.			0.0233	32.71 31.84	23.94	3.210 - 3.176 *		3.159
SIG EFF OF LOST.	0.0191		0.0266	31.86 31.88	23.96			3.157
			0.0300					
			0.0333	31.61	23.69			3.154
			0.0500	30.82	22.90			3.141
			0.0666 0.0833	30.21 29.56	22.29 21.64	3.104 * 3.075 *		3.127 3.114
			0.0033	27.70	21.04	3.073 -		3.114

WELL G116A	Depth	Water	Natural Log of	REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
		•••••		
0.1000	29.36	21.44	3.065 *	3.101
0.1166	29.00	21.08	3.048 *	3.088
0.1333	28.65	20.73	3.032 *	3.074
0.1500	28.33	20.41	3.016 *	3.061
0.1666	28.02	20.10	3.001 *	3.048
0.1833	27.75	19.83	2.987 *	3.034
0.2000	27.48	19.56	2.973 *	3.021
0.2166	27.22	19.30	2.960 *	3.008
0.2333	26.97	19.05	2.947 *	2.995
0.2500	26.73	18.81	2.934 *	2.981
0.2666	26.48	18.56	2.921 *	2.968
0.2833	26.24	18.32	2.908 *	2.955
0.3000	26.00	18.08	2.895 *	2.941
0.3166	25.77	17.85	2.882 *	2.928
0.3333	25.56	17.64	2.870 *	2.915
0.4167	24.49	16.57	2.808 *	2.848
0.5000	23.53	15.61	2.748 *	2.782
0.5833	22.64	14.72	2.689 *	2.716
0.6667	21.79	13.87	2.630 *	2.649
0.7500	20.98	13.06	2.570 *	2.583
0.8333	20.23	12.31	2.510 *	2.516
0.9167	19.44	11.52	2.444 *	2.450
1.0000	18.76	10.84	2.383 *	2.383
1.0833	18.10	10.18	2.320 *	2.317
1.1670	17.49	9.57	2.259 *	2.250
1.2500	16.91	8.99	2.196 *	2.184
1.3333	16.35	8.43	2.132 *	2.118
1.4166	15.84	7.92	2.069 *	2.051
1.5000	15.33	7.41	2.003 *	1.985
1.5833	14.86	6.94	1.937 *	1.919
1.6667	14.40	6.48	1.869 *	1.852
1.7500	13.98	6.06	1.802 *	1.786
1.8333	13.57	5.65	1.732 *	1.719
1.9167	13.19	5.27	1.662 *	1.653
2.0000	12.81	4.89	1.587 *	1.586
2.5000	11.02	3.10	1.131	1.188
3.0000	9.74	1.82	0.599	0.789
3.5000	8.94	1.02	0.020	0.391
4.0000	8.47	0.55	-0.598	-0.008
4.5000	8.20	0.28	-1.273	-0.406
5.0000	8.04	0.12	-2.120	-0.805
5.5000	7.98	0.06	-2.813	-1.204
6.0000	7.93	0.01	-4.605	-1.602

Slug Test at G116A



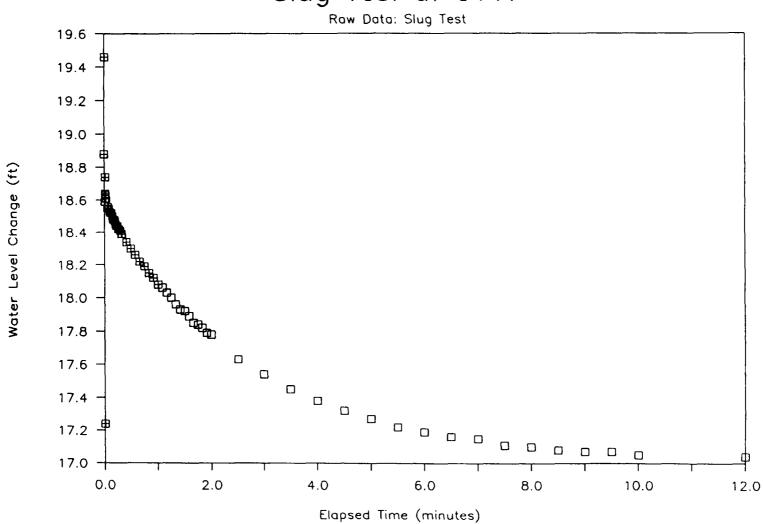


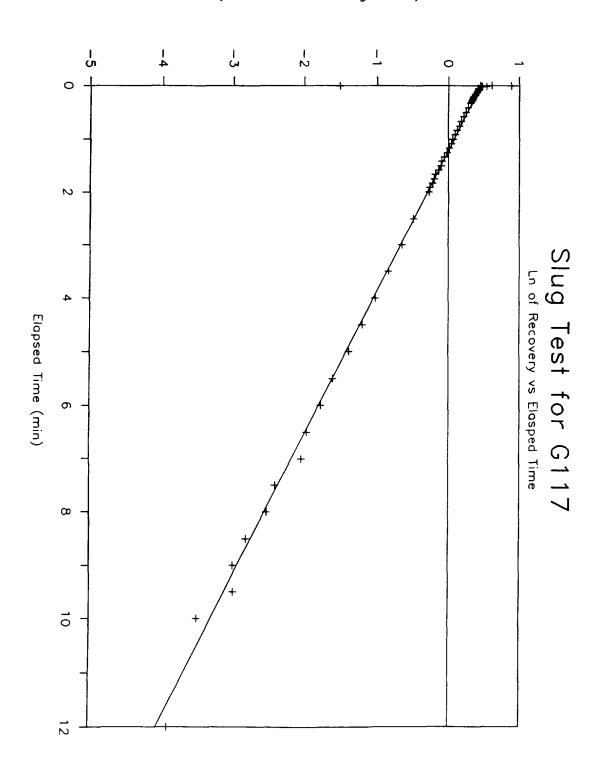
## SLUG TEST RESULTS FOR: G117 Winnebago Reclamation Landfill

WELL INFORMATION				<b></b>				
Casing Diameter (in)				2		• • • • • • • • • • • • • • • • • • • •		
Effective Casing RAD		·c)		1.00				
Screen Diameter (in)		-•		2.0				
Effective RADIUS (in	)(rw)			1.89				
Screen Length (ft)(L	)			10.00				
Aquifer Thickness (f	t)(0)			200.0				
Well Penetration (ft	)(H)			19.00				
					• • • • • • • • • • • • • • • • • • • •		• • • • • • • • • • • • • • • • • • • •	- <i>-</i>
CALCULATED PARAMETER	S							
L / rw				63.5	•••••	• • • • • • • • • • •		
A .				3.40				
B				0.60				
C				NA.				
ln ((D-h)/rw)				7.05				
in (Re / rw) Fully P	enetrating	1		NA				
In (Re / rw)Partiall				2.86				
ln (Re / rw)Partiall	y Penetrat	ing(>6)		2.94				
1/t * ln (Yo /Yt)				0.38				
RESULTS				FT/MIN	FT/DAY	GPD/SQ.FT	CM/SEC	• • • • • • • • • • • • • • • • • • • •
							• • • • • • • • • • • • • • • • • • • •	
Hydraulic Conductivi				NA	NA		NA	
Hydraulic Conductivi				3.74E-04		4.03E+00		
Hydraulic Conductivi	ty Partial	-P (>6)		3.85E-04	5.55E-01	4.15E+00	1.96E-04	
				SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	
Transmissivity Fully				NA	NA.	NA NA	NA.	
Transmissivity Parti				7.48E-02	107.8		1.16E-04	
Transmissivity Parti				7.70E-02	110.9	829.6	1.19E-04	
				Depth	Uatan	Natural Log	 	REGR
				to		Water Level	01	LINE
		т	ime (min)		Change	Change		CALC.
				•				
Regression	Output:		0.0000	18.88	1.86	0.621		0.456
Constant	•	0.456	0.0033	19.46	2.44	0.892		0.455
Std Err of Y Est		0.043	0.0066	17.24	0.22	-1.514		0.454
R Squared		0.998	0.0099	18.59	1.57	0.451		0.452
No. of Observations		61	0.0133	18.59	1.57	0.451 *		0.451
Degrees of Freedom		59	0.0166	18.74	1.72	0.542 *		0.450
			0.0200	18.64	1.62	0.482 *		0.449
	-0.3769		0.0233	18.63	1.61	0.476 *		0.447
Std Err of Coef.	0.0020		0.0266	18.63	1.61	0.476 *		0.446
			0.0300	18.61	1.59	0.464 *		0.445
			0.0333	18.61	1.59	0.464 *		0.444
			0.0500	18.55	1.53	0.425 *		0.437
			0.0666	18.56	1.54	0.432 *		0.431
			0.0833	18.55	1.53	0.425 *		0.425

WELL G117	Depth		Natural Log of	REGR
Time (min)]	to		Water Level	LINE CALC.
11me (min)]		Change	Change	CALU.
0.1000	18.53	1.51		0.419
0.1166	18.52	1.50		0.412
0.1333	18.52	1.50		0.406
0.1500	18.50	1.48		0.400
0.1666	18.48	1.46		0.393
0.1833	18.48	1.46		0.387
0.2000	18.47	1.45		0.381
0.2166	18.45	1.43	0.358 *	0.375
0.2333	18.44	1.42	0.351 *	0.368
0.2500	18.44	1.42	0.351 *	0.362
0.2666	18.42	1.40	0.336 *	0.356
0.2833	18.42	1.40	0.336 *	0.349
0.3000	18.41	1.39	0.329 *	0.343
0.3166	18.39	1.37		0.337
0.3333	18.39	1.37		0.331
0.4167	18.34	1.32		0.299
0.5000	18.30	1.28		0.268
0.5833	18.26	1.24	0.215 *	0.236
0.6667	18.22	1.20		0.205
0.7500	18.19	1.17		0.174
0.8333	18.15	1.13	0.122 *	0.142
0.9167	18.12	1.10	0.095 *	0.111
1.0000	18.08	1.06		0.079
1.0833	18.06	1.04	0.039 *	0.048
1.1670	18.03	1.01	0.010 *	0.016
1.2500 1.3333	18.00 17.96	0.98 0.94	-0.020 * -0.062 *	-0.015 -0.046
1.4166	17.93	0.91	-0.094 *	-0.078
1.5000	17.92	0.90	-0.105 *	-0.109
1.5833	17.89	0.87	-0.139 *	-0.140
1.6667	17.85	0.83	-0.186 *	-0.172
1.7500	17.84	0.82	-0.198 *	-0.203
1.8333	17.82	0.80	-0.223 *	-0.235
1.9167	17.79	0.77		-0.266
2.0000	17.78	0.76	-0.274 *	-0.297
2.5000	17.63	0.61	-0.494 *	-0.486
3.0000	17.54	0.52	-0.654 *	-0.674
3.5000	17.45	0.43	-0.844 *	-0.863
4.0000	17.38	0.36	-1.022 *	-1.051
4.5000	17.32	0.30	-1.204 *	-1.240
5.0000	17.27	0.25	-1.386 *	-1.428
5.5000	17.22	0.20	-1.609 *	-1.617
6.0000	17.19	0.17	-1.772 *	-1.805
6.5000	17.16	0.14	-1.966 *	-1.993
7.0000	17.15	0.13	-2.040 *	-2.182 -2.770
7.5000	17.11	0.09	-2.408 *	-2.370 -2.550
8.0000	17.10	0.08	-2.526 *	-2.559 -2.747
8.5000 9.0000	17.08	0.06 0.05	-2.813 <b>*</b> -2.996 <b>*</b>	-2.747 -2.936
9.5000	17.07 17.07	0.05	-2.996 *	-2.936 -3.124
10.0000	17.07	0.03	-2.996 - -3.507 *	-3.124 -3.312
12.0000	17.05	0.02	-3.912	-4.066
14.0000	17.02	J.02	w.716	-4.820
1419000				

Slug Test at G117

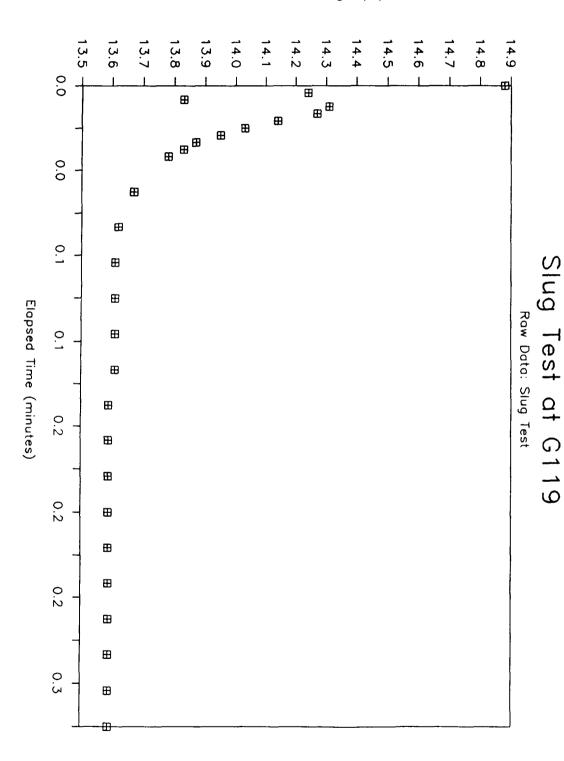


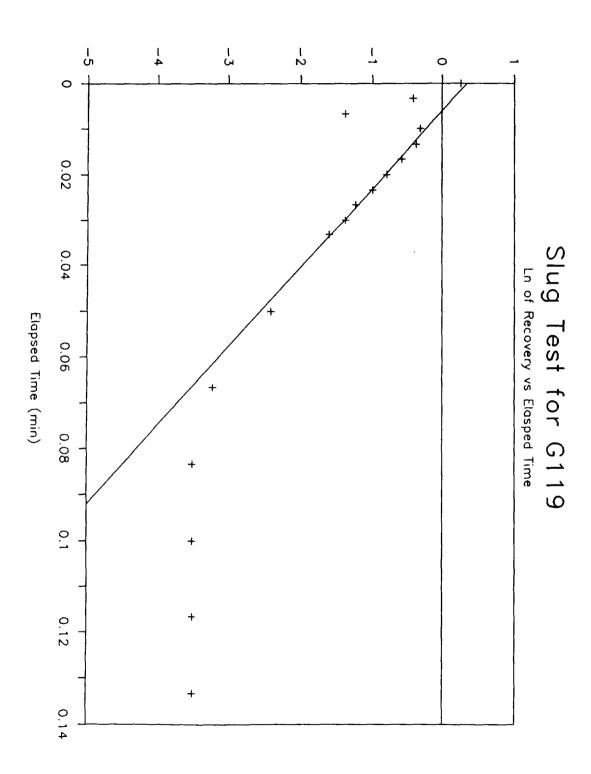


## SLUG TEST RESULTS FOR: G119 Winnebago Reclamation Landfill

WELL INFORMATION								
Casing Diameter (in)	·			2				
Effective Casing RAD		)		1.28				
Screen Diameter (in)				2.0				
Effective RADIUS (in				1.89				
Screen Length (ft)(I	.)			7.26				
Aquifer Thickness (1	-			200.0				
Well Penetration (fi				7.26				
							•••••	• • • • • • • • • • • • • • • • • • • •
CALCULATED PARAMETER	rs							
L / rw				46.1				
A				2.90				
8				0.45				
C				NA				
ln ((D-h)/rw)				7.11				
In (Re / rw) Fully F	Penetrating			NA				
ln (Re / rw)Partial(	•	-		2.38				
ln (Re / rw)Partial	y Penetratir	<b>1g(&gt;</b> 6)	)	2.45				
1/t * ln (Yo /Yt)				58.11				
0F014 T0								• • • • • • • • • • • • • • • • • • • •
RESULTS				FT/MIN	FI/UAY	GPD/SQ.FT	CM/SEC	
Hydraulic Conductivi	ty Fully-P			NA	NA	NA	NA	
Hydraulic Conductivi	ty Partial-P	•		1.09E-01	1.56E+02	1.17E+03	5.51E-02	
Hydraulic Conductivi	ty Partial-P	(>6	)	1.11E-01	1.60E+02	1.20E+03	5.66E-02	
***************************************		• • • • •		SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	••••••
	_						••••••	• • • • • • • • •
Transmissivity Fully				NA 2.47-04	NA 74040 A	NA	NA 7.7.7.02	
Transmissivity Parti				2.17E+01 2.23E+01		233814.0 240012.5	3.36E-02 3.45E-02	
Transmissivity Parti	a(-P (>0)			2.236+01	32070.0	240012.3	3.436-02	
			WELL G119	Depth	Water	Natural Log	of	REGR
				to		Water Level		LINE
			Time (min)	Water	Change	Change		CALC.
				•••••				
Regression			0.0000	14.88	1.30	0.262		0.345
Constant		345	0.0033	14.24	0.66			0.153
Std Err of Y Est	-	.049		13.83	0.25			-0.038
R Squared	U		0.0099	14.31 14.27	0.73 0.69	-0.315 *		-0.230 -0.428
No. of Observations Degrees of Freedom		8 6	0.0133 0.0166	14.27	0.56	-0.371 * -0.580 *		-0.428
regrees of recoom			0.0200	14.03	0.45	-0.799 *		-0.817
X Coefficient(s)	58.1084		0.0233	13.95	0.37	-0.994 *		-1.009
Std Err of Coef.	2.2632		0.0266	13.87	0.29	-1.238 *		-1.201
			0.0300	13.83	0.25	-1.386 *		-1.398
			0.0333	13.78	0.20	-1.609		-1.590
			0.0500	13.67	0.09	-2.408		-2.560
			0.0666	13.62	0.04	-3.219		-3.525
			0.0833	13.61	0.03	-3.507		-4.495

WELL G119	Depth	Water	Natural Log of	REGR
	to	level	Water Level	LINE
Time (min)	Water	Change	Change	CALC.
	47.74		2.62	
0.1000	13.61	0.03	-3.507	-5,466
0.1166	13.61	0.03	-3.507	-6.430
0.1333	13.61	0.03	-3.507	-7.401
0.1500	13.59	0.01	-4.605	-8.371
0.1666	13.59	0.01	-4.605	-9.336
0.1833	13.59	0.01	-4.605	-10.306
0.2000	13.59	0.01	-4.605	-11.277
0.2166	13.59	0.01	-4.605	-12.241
0.2333	13.59	0.01	-4.605	-13.212
0.2500	13.59	0.01	-4.605	-14.182
0.2666	13.59	0.01	-4.605	-15.147
0.2833	13.59	0.01	-4.605	-16.117
0.3000	13.59	0.01	-4.605	-17.087
0.3166	13.59	0.01	-4.605	-18.052
0.3333	13.59	0.01	-4.605	-19.022
0.4167	13.59	0.01	-4.605	-23.869
0.5000	13.59	0.01	-4.605	-28.709
0.5833	13.59	0.01	-4.605	-33.550
0.6667	13.59	0.01	-4.605	-38.396
0.7500	13.59	0.01	-4.605	-43.236
0.8333	13.59	0.01	-4.605	-48.077
0.9167	13.59	0.01	-4.605	-52.923
1.0000	13.59	0.01	-4.605	-57.763
1.0833	13.59	0.01	-4.605	-62.604
1.1670	13.59	0.01	-4.605	-67.467
1.2500	13.59	0.01	-4.605	-72.290
1.3333	13.59	0.01	-4.605	-77.131
1.4166	13.59	0.01	-4.605	-81.971
1.5000	13.59	0.01	-4.605	-86.817
1.5833	13.59	0.01	-4.605	-91.658
1.6667	13.59	0.01	-4.605	-96.504
1.7500	13.59	0.01	-4.605	-101.345
1.8333	13.59	0.01	-4.605	-106.185
1.9167	13.59	0.01	-4.605	-111.031
2.0000	13.59	0.01	-4.605	-115.872
2.5000	13.59	0.01	-4.605	-144.926
3.0000	13.59	0.01	-4.605	-173.980

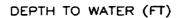


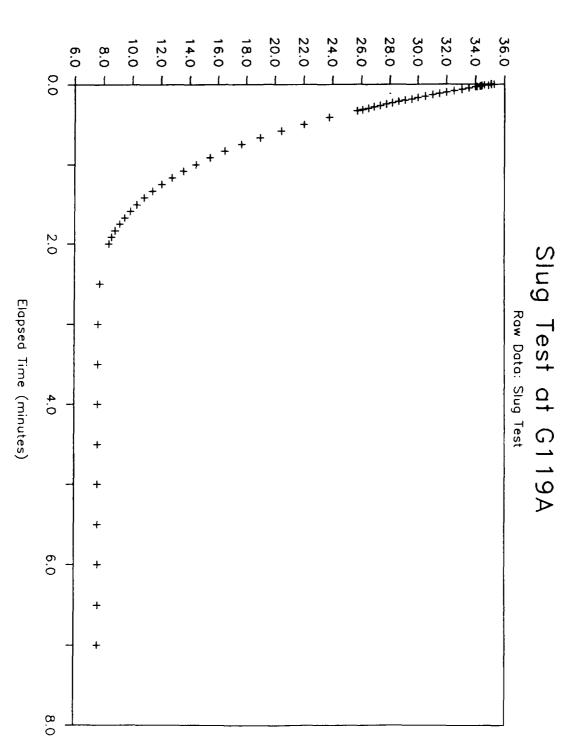


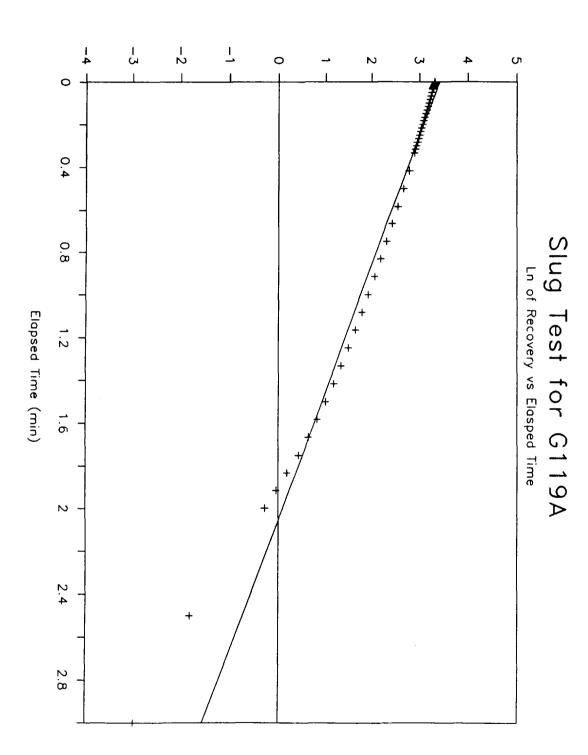
## SLUG TEST RESULTS FOR: G119A Winnebago Reclamation Landfill

WELL INFORMATION							
Casing Diameter (in	· · · · · · · · · · · · · · · · · · ·		 2			• • • • • • • • •	
Effective Casing RA	•		1.00				
Screen Diameter (in			2.0				
Effective RADIUS (i	*		1.89				
Screen Length (ft)(			5.00				
Aquifer Thickness (	•		200.0				
Well Penetration (f			43.08				
CALCULATED PARAMETE	R\$			*********	******		
L / rw			31.7		••••••		
A			2.45				
В			0.40				
C			NA				
in ((D-h)/rw)			7.18				
In (Re / rw) Fully	Penetrating		NA				
in (Re / rw)Partial			2.75				
In (Re / rw)Partial		5)	2.87				
1/t * ln (Yo /Yt)			1.66				
RESULTS			FT/MIN	FT/DAY	GPD/SQ.FT	CM/SEC	••••••
***************************************			• • • • • • • • • • • • • • • • • • • •				
Hydraulic Conductiv	•		NA	NA	NA	NA	
Hydraulic Conductiv	-				5.60E+01	2.64E-03	
Hydraulic Conductiv	ity Partial-P (>6	•	5.42E-03	7.80€+00	5.84E+01	2.75E-03	
		!	SQ.FT/MIN	SQ.FT/DAY	GPD/FT	SQ.M/SEC	••••
Transmissivity Full	y-P		NA	NA	NA	NA	
Transmissivity Part	ial-P		1.30E+00	1870.9	13992.6	2.01E-03	
Transmissivity Part	ial-P (>6)		1.35E+00	1950.7	14589.4	2.10E-03	
		WELL G119A		Hatan	Natural Log		REGR
		WELL GITTA	Depth to		Water Level		LINE
		Time (min)	WATER	Change			CALC.
		11MG (M111)		CHELONE.	·····		••••••
Regression	Output:	0.0000	35.08	27.49	3.314		3.416
Constant	3.416	0.0033	35.29	27.70	3.321		3.411
Std Err of Y Est	0.117		35.10	27.51	3.315		3.406
R Squared	0.988		35.11	27.52	3.315 *		3.400
No. of Observations	44		34.61	27.02	3.297 *		3.394
Degrees of Freedom	42		34.89	27.30			3.389
		0.0200	34.45	26.86			3.383
X Coefficient(s)	-1.6611	0.0233	34.39	26.80			3.378
Std Err of Coef.	0.0283	0.0266	34.29	26.70			3.372
		0.0300	34.12	26.53			3.367
		0.0333	34.01	26.42	3.274		3.361
		0.0500	33.54	25.95	3.256		3.333
		0.0666	33.07	25.48	3.238		3.306
		0.0833	32.53	24.94	3.216		3.278

WELL G119A	Depth		Natural Log of	REGR
	to		Water Level	LINE
Time (min)	WATER	Change	Change	CALC.
0.1000	32.00	24.41	3.195	3.250
0.1166	31.52	23.93	3.175	3.223
0.1333	31.02	23.43	3.154	3.195
0.1500	30.50	22.91	3.132	3.167
0.1666	29.98	22.39	3.109	3.140
0.1833	29.57	21.98	3.090	3.112
0.2000	29.07	21.48	3.067	3.084
0.2166	28.61	21.02	3.045	3.057
0.2333	28.17	20.58	3.024	3.029
0.2500	27.74	20.15	3.003	3.001
0.2666	27.32	19.73	2.982	2.974
0.2833	26.89	19.30	2.960	2.946
0.3000	26.47	18.88	2.938	2.918
0.3166	26.08	18.49	2.917	2.891
0.3333	25.71	18.12	2.897	2.863
0.4167	23.76	16.17	2.783	2.724
0.5000	22.03	14.44	2.670	2.586
0.5833	20.46	12.87	2.555	2.448
0.6667	18.98	11.39	2.433	2.309
0.7500	17.67	10.08	2.311	2,171
0.8333	16.47	8.88	2.184	2.032
0.9167	15.40	7.81	2.055	1.894
1.0000	14.43	6.84	1.923	1.755
1.0833	13.55	5.96	1.785	1.617
1.1670	12.76	5.17	1.643	1.478
1.2500	12.03	4.44	1.491	1.340
1.3333	11.39	3.80	1.335	1.202
1.4166	10.82	3.23	1.172	1.063
1.5000	10.30	2.71	0.997	0.925
1.5833	9.86	2.27	0.820	0.786
1.6667	9.47	1.88	0.631	0.648
1.7500	9.12	1.53	0.425	0.510
1.8333	8.79	1.20	0.182	0.371
1.9167	8.55	0.96	-0.041	0.233
2.0000	8.35	0.76	-0.274	0.094
2.5000	7.75	0.16	-1.833	-0.736
3.0000	7.64	0.05	-2.996	-1.567
3.5000	7.63	0.04	-3.219	-2.397
4.0000	7.63	0.04	-3.219	-3.228
4.5000	7.63	0.04	-3.219	-4.059
5.0000	7.63	0.04	-3.219	-4.889
5.5000	7.63	0.04	-3.219	-5.720
6.0000	7.63	0.04	-3.219	-6.550
6.5000	7.63	0.04	-3.219	-7.381
7.0000	7.61			-8.211
7.5000	7.61			-9.042







# APPENDIX E WATER LEVEL MEASUREMENTS

Winnebago Reclamation Landfill
Elevations are in feet referenced to mean sea level (MSL)
These elevations supercede those reported on well construction logs in Appendix B

Inner				Top of	Top of	Veter								
Length Top of Casing Casing Piezo of sand Screen Elevation Elevation or clay 8 No. Pack (ft)Elevation 8/89 8/89 well=8 16 729.0 773.19 772.87 u 21 722.1 792.66 792.40 u 17 712.0 745.14 745.00 B 21 724.5 757.97 757.66 u 18 718.9 752.94 754.28 u 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 754.21 B 28.5 718.6 754.53 755.22 u 10 717.6 759.25 759.22 u 28.5 718.6 758.79 759.22 u 28.5 718.6 758.79 759.22 u 29.68.7 759.23 759.60 B 21 714.3 760.85 760.52 u 24 707.3 744.86 744.55 u 24 707.3 744.86 744.55 u 25 770.1 755.26 755.29 u 26 665.1 755.26 755.29 u 27 713.0 754.36 755.29 u 28 770.1 755.26 759.79 u 29.5 684.4 761.26 761.03 u 21 771.4 775.2 760.80 u 21 771.5 771.5 771.50 u 21 771.5 771.5 176.5 u 21 771.6 771.6 u 21 771.6 771.7 771.0 u 21 771.7 771.0 u 21 771.7 771.0 u 21 771.7 771.0 u 22 772.7 751.00 u 23 772.1 760.20 760.00 u 24 777.2 760.20 760.00 u 25 777.2 760.20 760.00 u 26 777.2 760.20 760.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 777.7 771.00 u 27 771.00 u 27 777.7 771.00 u 27 771.00 u 27 772.7 770.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u 27 772.7 u				Outer	Imer	Tables		Water	Vater	Water	Veter	Vater	Veter	Water
### 196. Peck (#D. Flewation 8/89) 8/89 wellse 4/6/88 5/17/88 6/16/88 8/5/88  16 729.0 773.19 772.87 w		Length of send		Casing Elevation	Casing Elevation	Piezo or cley	Elevation	Elevatio	nEl evatio	nElevatio	nElevatía	nElevation	Elevation	Elevation
16 779.0 773.19 777.87 W M 734.59 733.46 731.09 21 722.1 772.6 773.40 W M 734.59 733.46 731.09 21 722.1 772.6 773.40 W M 734.59 733.46 730.07 21 72.0 745.14 745.00 B M 734.55 731.91 729.18 21 724.5 775.77 77.76 W 734.50 1 734.71 730.29 727.01 724.32 21 724.1 734.3 734.02 B 734.71 730.29 727.01 724.32 21.5 723.3 725.15 731.65 W 736.04 722.19 729.31 726.65 21.5 723.3 725.15 731.65 W 736.04 722.19 729.31 726.65 22 704.6 74.65 74.45 74.44 W 723.50 722.12 720.37 23 715.3 715.0 736.22 W M 723.50 722.12 720.37 24 625.3 713.47 713.62 W 722.02 723.03 721.09 25 704.6 74.65 74.45 W 722.02 723.03 721.09 26 625.3 713.47 713.0 W 722.02 723.67 713.47 26 704.4 717.42 W 723.04 772.21 722.35 721.09 27 703.8 744.55 749.50 W 709.11 708.63 708.33 707.44 28 707.1 713.0 W 723.00 709.20 708.03 707.44 29 625.1 743.3 761.04 765.20 W 709.11 708.63 708.33 707.44 29 625.1 743.3 744.50 W 709.11 708.63 708.33 707.44 29 625.1 743.5 744.50 W 709.11 708.63 708.33 707.44 29 625.1 744.3 744.50 W 709.11 708.63 708.33 707.44 29 625.1 744.3 744.50 W 709.11 708.63 708.33 707.44 20 77 703.8 744.50 W 709.11 708.63 708.33 707.44 21 711.4 739.74 739.79 W 739.03 777.03 779.21 715.20 719.37 21 711.4 739.74 739.79 W 739.03 777.70 713.75 713.60 713.75 713.37 21 713.4 739.74 739.70 W 739.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70 779.70	Boring No.	Pack (ft	)Elevation	•	8/89	8=1   es	88/9/7	5/17/88	6/16/88		8/52/8	•	11/9/88	68/8/9
21 722.1 792.66 792.40 U	=	16	729.0		72.87	>	X	734.59			729.97	727.65	727.16	725.33
17 712.0 745.14 745.00 B NA 738.74 738.15 735.95   21 724.5 757.97 757.66 U 734.96 734.35 751.91 720.18   18 718.9 752.94 752.85 U NA 729.55 757.92 756.05   19 717.6 750.55 754.21 B 754.39 756.61 724.35 751.91 750.18   28.5 713.6 753.75 754.21 B 754.94 752.19 750.51 752.69   28.5 713.6 753.75 754.21 B 754.94 752.19 752.19 752.10 752.59   28.5 713.6 753.75 754.24 U 713.77 713.75 713.05 712.34   28.5 713.6 753.75 750.22 U NA 725.50 722.12 720.57   28.5 713.6 753.75 750.22 U NA 725.50 722.12 720.57   28.5 713.6 753.75 750.22 U NA 725.50 722.12 720.57   29 665.3 743.59 743.54 B 715.20 U 715.25 720.75 719.29   21 714.3 760.45 770.04 775.72 714.92 714.17 713.20   21 714.3 760.45 770.54 U 715.72 714.92 714.17 713.20   22 726.41 775.62 777.30 U 715.72 714.92 714.17 713.20   23 726.41 775.62 777.30 U 715.42 710.87 710.87   24 770.4 775.62 777.30 U 715.42 710.87 710.87   25 726.41 775.62 777.30 U 717.80 T 715.30 710.87   26 665.7 760.45 760.52 U 710.00 770.45 710.87   27 773.8 746.45 746.52 U 710.00 770.45 710.87   28 726.41 775.62 775.30 U 717.80 T 717.80 710.87   29 665.7 760.48 744.55 U 710.00 710.87 710.87   29 665.7 760.48 744.55 U 710.00 710.87 710.87   20 665.7 760.48 744.55 U 710.00 710.87 710.87   20 665.7 760.48 744.55 U 710.00 710.87 710.87   20 665.7 760.48 744.55 U 711.38 700.00 710.87   20 665.7 760.48 744.55 U 711.38 700.90 710.87   20 665.7 760.48 745.78 U 711.38 700.90 710.87   20 665.7 760.48 745.78 U 711.38 700.90 710.87   20 665.7 760.80 760.70 U 717.20 710.87 710.87   20 665.7 760.80 760.70 U 717.20 710.87 710.87   20 665.7 775.3 775.3 0 775.3 0 775.3 0 775.3 775.3 0 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 775.3 1 7	2	2	722.1		-	3	¥	24.6			•	• -	726.95	22
21 724.5 757.97 757.66 W 734.96 734.35 731.91 729.18 15 718.9 732.96 W 732.65 W W 729.55 777.92 726.05 66 666.6 734.53 754.21 B 728.93 726.61 724.32 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 727.92 726.05 726.05 727.92 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05 726.05	5	17	712.0			•	≨	738.74				•	78.15	
15 718.9 752.94 752.55 U	*	23	724.5		•	>	74.8	724.35				•-	25.78	
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28.3 715.3 761.04 760.74 W 722.92 723.64 720.75 719.29 10 686.7 759.23 759.09 B 722.31 722.56 720.74 718.57 21 714.3 760.85 760.52 W 722.23 723.89 721.89 719.64 12.5 706.9 739.69 739.64 W 715.72 714.92 714.17 713.20 10 704.4 717.62 717.30 W 713.40 712.32 711.64 710.87 24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 663.1 743.68 743.52 B 709.26 708.39 707.84 23 720.1 743.68 743.52 B 709.26 708.39 707.84 11 711.4 739.74 739.58 W 711.38 709.90 709.19 706.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 18 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 12 727.3 763.48 763.29 W 773.25 775.01 773.30 771.21	20	•				•	₹	¥	714.47				211.70	
10 686.7 759.23 759.09 8 722.31 722.56 720.74 718.57 21 714.3 760.85 760.52 W 722.23 723.89 721.89 719.64 12.5 706.9 739.69 739.64 W 715.72 714.92 714.17 713.20 10 704.4 717.62 717.30 W 713.40 712.32 711.64 710.87 24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 683.1 743.68 743.52 B 709.26 708.39 707.84 23 720.1 743.68 743.52 B 709.26 708.99 707.84 11 711.4 739.74 739.58 W 711.38 709.90 709.19 706.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 15 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 15 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 15 727.3 763.48 763.29 W 773.25 775.30 771.21	Ξ	28.3				>	722.92	723.84					716.48	
21 714.3 760.65 760.52 W 722.23 723.89 721.89 719.64 12.5 706.9 739.69 739.64 W 715.72 714.92 714.17 713.20 10 704.4 717.62 717.30 W 713.40 712.32 711.64 710.87 24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 643.1 743.68 743.52 B 709.26 708.96 708.39 707.84 23 720.1 743.23 762.87 W 739.03 727.63 722.85 11 711.4 739.74 739.58 W 711.38 709.90 709.19 706.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 15 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 12 727.3 763.48 763.29 W 773.25 775.01 773.30 771.21	411	2				•	722.31	722.56					716.22	
12.5 706.9 739.69 739.46 M 715.72 714.92 714.17 713.20 10 704.4 717.62 717.30 W 713.40 712.32 711.64 710.87 24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 643.1 743.68 743.52 B 709.26 708.98 708.39 707.84 23 720.1 743.68 743.52 B 750.03 727.63 722.85 11 711.4 739.74 739.58 W 711.38 709.00 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 13 712.1 746.22 746.08 W 717.26 716.85 714.89 13 712.1 746.22 746.08 W 717.26 716.85 714.89 13 712.1 746.22 746.08 W 717.26 719.21 718.29 716.72 14 72.1 746.24 741.04 W 719.69 719.21 718.29 716.72 15 727.3 763.48 763.29 W 773.25 775.70 771.21	21	2				3	722.23	723.89					717.14	
10 704.4 717.62 717.30 W 713.40 712.32 711.64 710.87 24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 643.1 743.68 743.52 B 709.26 708.99 707.84 23 720.1 743.68 743.52 B 750.03 727.63 722.85 11 711.4 739.74 739.58 W 711.38 709.90 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 15 712.1 746.22 746.08 W 717.26 716.85 716.85 714.89 13 712.1 746.22 746.08 W 717.26 719.21 718.29 716.74 12 727.3 763.48 763.29 W 773.25 775.70 773.30 771.21	<b>E13</b>	12.5				>	715.72	714.92					712.34	
24 707.3 744.86 744.55 W 709.67 708.62 708.01 707.48 7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 643.1 743.68 743.52 B 709.26 708.98 708.39 707.84 23 720.1 743.68 743.52 B 750.03 727.43 722.85 9 645.7 762.84 762.72 B 750.02 727.88 725.55 722.88 11 711.4 739.74 739.58 W 711.38 709.90 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 13 712.1 746.22 746.08 W 717.26 716.85 716.85 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.72 12 727.3 763.48 763.29 W 773.25 775.01 773.30 771.21	7	2	7.78			>	713.40	712.32				710.69	710.57	
7 703.8 746.16 746.29 W 709.11 708.83 708.33 707.64 9 683.1 743.68 743.52 B 709.26 708.98 708.39 707.84 23 720.1 763.23 762.87 W 730.03 727.63 725.85 9 665.7 762.84 762.72 B 730.02 727.88 725.85 11 711.4 739.74 739.58 W 711.38 709.90 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 13 712.1 746.22 748.08 W 717.26 716.85 716.85 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 773.25 775.70 773.30 771.21	=======================================	*	707.3			>	79.67	708.62			707.23		706.8%	
9 683.1 743.68 743.52 8 709.26 708.98 708.39 707.84  23 720.1 763.23 762.87 W 730.03 727.63 725.85 722.85  9 665.7 762.84 762.72 8 730.02 727.88 725.55 722.88  11 711.4 739.74 739.58 W 711.38 709.00 709.19 708.44  17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91  16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57  13 712.1 746.22 748.08 W 717.26 716.85 716.85 714.89  13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74  12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	2	~	703.8			>	200.1	706.83			707.39		36.9	
23 720.1 763.23 762.87 W 730.03 727.63 725.56 722.85 9 665.7 762.84 762.72 B 730.02 727.88 725.55 722.88 11 711.4 739.74 739.58 W 711.38 709.90 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 13 712.1 746.22 748.08 W 717.26 716.85 714.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.00 721.21	\$	•	683.1			-	200.58	708.98			707.58		707.16	
9 665.7 762.84 762.72 B 730.02 727.86 725.55 722.86 11 711.4 739.74 739.58 W 711.36 709.09 709.19 708.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 13 712.1 748.22 748.08 W 717.26 716.85 716.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	<b>8</b> 16	Ŋ	28.			>	730.03	27.63			721.97		719.91	
11 711.4 739.74 739.58 W 711.38 709.90 709.19 706.44 17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 9.5 684.4 761.26 761.03 B 721.00 723.47 721.56 719.37 13 712.1 748.22 748.08 W 717.26 716.85 716.85 714.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	491	•	£53.7			-	730.02						719.97	718.57
17 715.0 751.37 751.29 W 717.86 717.70 715.34 714.91 16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 9.5 684.4 761.26 761.03 B 721.00 723.47 721.56 719.37 13 712.1 748.22 748.08 W 717.26 716.85 716.85 714.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	<b>G</b> 107	=	7.11.4			<b>&gt;</b>	711.38				708.06		707.41	707.38
16 717.2 760.8 760.79 W 722.15 723.88 721.92 719.57 9.5 684.4 761.26 761.03 B 721.00 723.47 721.56 719.37 13 712.1 748.22 748.08 W 717.26 716.85 716.85 714.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	6106	1	715.0	• -		>	717.86	717.70	•		714.27	713.16	712.99	
9.5 684.4 761.26 761.03	62	2	717.2			<b>-</b>	722.15	723.88	• -	•	718.65		716.99	
13 712.1 746.22 748.06 W 717.26 716.85 716.85 714.89 13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	6109A	9.5	7.799			-	721.00	723.47			718.47	717.08	716.83	
13 712.6 741.24 741.04 W 719.69 719.21 718.29 716.74 12 727.3 763.48 763.29 W 723.25 725.07 723.20 721.21	6110	<b>5</b>	712.1			>	717.26	716.85	•-		714.44	•	713.72	
12 727.3 763.48 763.29 V 723.25 725.07 723.20 721.21	1111	<b>5</b>	712.6		•	>	719.69	719.21				•	713.28	
	6112	7	727.3		763.29	>	723.25	725.07	• •	12.121	•	,-	717.97	

Winnebago Reclamation Landfill Elevations are in feet referenced to mean sea level (MSL) These elevations supercede those reported on well construction logs in Appendix B

Boring No.		-		Top of Inner Casing Elevation 8/89	well=B	4/6/88		Water nElevatio 6/16/88			Water nElevatio	Water nElevation 11/9/88	Water Elevation 6/8/89
6113	12	721.4	762.29	762.22	u	720.95	721.42	720.06	718.52	717.78	716.67	716.56	716.05
G113A	12	690.0	762.85	762.89	В	721.01	721.24	719.93	718.41	717.75	716.64	716.52	716.02
G114	12	719.9	758.25	758.11	W	721.28	722.11	720.41	718.55	717.67	716.36	716.28	715.76
G115	13	715.9	729.3	729.03	W	713.13	713.03	710.63	709.09	708.86	708.86	708.78	712.58
G116	11.5	707.9	713.92	713.76	W	707.90	706.88	706.55	706.09	706.00	706.08	705.71	706.35
G116A	15	673.4	714.23	714.06	B	707.88	706.93	706.63	706.17	706.04	706.12	706.24	706.38
<b>G117</b>	16	707.4	723.61	723.25	W	708.41	707.86	707.29	706.82	706.59	705.45	706.33	706.59
G118A	9			· · · - · ·		708.79							706.81
G1 18R	12	. NA	717.93	717.61	W	NA	. NA	707.80	707.17	706.90	706.76	706.63	706.86
6119	14.5	709.5	720.44	720.22	· W	708.27	707.95	707.34	706.71	706.42	706.20	706.09	706.20
6119A	13	674.5	720.19	720.04	<b>.</b> B	708.01	707.82	707.22	706.52	706.26	705.98	705.85	705.84
P1	7	695.3	728.06	727.69	8	708.03	707.16	706.81	706.47	706.34	706.35	706.27	706.64
P3R	14	708.4	749.74	749.58	W	708.08	707.26	706.98	706.58	706.47	706.36	706.37	706.66
P4R	14	683.7	749.98	749.80		708.14	707.39	707.13	706.73	706.62	706.51	706.48	706.81
P6	6.5	692.0	740.31	739.71	8	715.32	714.42	713.71	712.78	712.41	712.07	711.99	711.98
P7					W	708.55	707.99	707.39	706.94	706.73	706.54	706.43	
PB			748.77	748.18	B	NA	NA.	728.55	726.49	720.58	723.98	723.60	724.06
P9			749.12	748.67	, B	NA	AK I	728.47	726.54	725.64	724.05	723.66	748.67
MJ-101					B	NA	NA	NA	, NA	730.20	727.73	727.32	!
My-102					В	NA	N.A	NA	731.73	730.87	•	728.17	725.64
MM-103			751.65		8	NA	734.01	732.79	730.49	729.36	727.20	726.72	725.96
MI-104			757.16			NA			725.95	725.11	723.54	723.20	722.36
MJ-105	12.5				-	734.89	730.26	726.95	724.42	723.55	721.90	721.60	721.20
MV-106	13	674.7	727.47	725.89	) B	707.76	707.13	706.82	706.46	706.35	705.90	704.79	706.66
MJ-107			750.62	749.78	8 8	NA	N.A	722.51	720.50	719.52	716.74	717.31	714.98

Top of Inner Casing Top of Outer Cesting

to Mater Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Water Wat		Top of	Casing	Casing	\$	Depth	Depth	Depth to	Depth to	Depth to	Depth to	Depth
Ho. Elevation 8/89         8/89         Ob Apr 88 17 Nay 88 16 Jun 88 05 Aug 88 29 Aug 88 29 Aug 88 27 Aug 88 27 Aug 88 27 Aug 88 27 20 20 20 20 20 20 20 20 20 20 20 20 20		Screen	Elevation	Elevation	Water				_	Veter	Veter	to Water
729.0 773.19 772.87 IN 350.28 39.41 41.78 772.1 772.1 772.6 IN 57.00 59.12 61.53 772.1 772.6 772.4 IN 57.00 59.12 61.53 772.1 772.6 772.4 775.66 22.70 25.31 25.75 26.46 778.4 772.0 IN 57.00 59.12 61.53 772.1 754.3 772.4 775.66 22.70 25.31 25.75 26.40 778.6 772.34 774.21 25.62 27.40 29.38 31.52 27.01 29.40 775.6 25.42 774.21 25.62 27.40 29.38 31.52 772.1 754.33 774.21 25.62 27.40 29.38 31.52 772.1 754.33 774.21 25.62 27.40 29.38 31.52 772.1 29.40 775.6 775.2 776.2 IN 20.75 28.40 775.6 775.2 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2 IN 20.75 776.2	Boring No.	. Elevation	8/80	8/89	06 Apr 88					1 25 Oct 88	3 09 Nov 88	08 Jul 89
722.1 772.66 772.40 NA 57.80 59.12 61.53 712.0 745.14 745.00 NA 6.26 6.85 9.05 772.1 772.47 757.66 22.70 23.31 25.75 28.48 778.9 752.94 754.02 19.31 23.73 27.01 29.70 666.4 754.34 754.22 19.31 23.73 27.01 29.70 706.1 754.34 754.22 19.31 23.73 27.01 29.70 706.1 754.34 754.22 19.31 23.73 27.01 29.70 706.2 754.34 754.22 19.31 23.73 27.01 29.70 775.4 750.55 750.22 NA 26.72 28.10 29.35 775.6 758.79 758.39 33.98 33.98 35.53 37.49 776.8 744.65 744.34 30.57 30.59 31.29 32.00 665.3 743.93 743.94 34.54 36.53 34.63 36.53 774.3 760.65 760.52 34.29 36.53 36.53 40.88 774.3 760.65 775.02 34.29 36.53 36.53 774.4 777.6 775.2 34.29 36.53 36.53 774.5 776.6 746.29 37.18 37.46 37.96 38.65 665.1 745.26 745.29 37.18 37.46 37.96 38.65 665.1 745.26 745.29 37.18 37.46 37.96 38.65 665.1 745.26 745.29 37.18 37.46 37.96 38.65 665.1 746.26 746.29 37.18 37.46 37.96 38.65 665.1 746.26 746.29 37.18 37.46 37.96 38.65 665.1 746.26 746.29 37.18 37.46 37.96 38.65 775.1 775.0 775.2 32.70 34.54 37.71 39.64 775.1 776.26 776.29 37.18 37.46 37.96 38.65 775.2 776.28 776.29 37.18 37.46 37.97 775.1 776.26 776.29 37.18 37.46 37.97 775.1 776.26 776.29 37.18 37.46 37.97 775.1 776.26 776.29 37.18 37.46 37.97 775.1 776.20 776.20 37.18 37.46 37.97 775.1 776.20 776.20 37.18 37.56 37.51 775.1 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 37.52 777.2 776.20 776.20 776.20	15	729.0			¥	38.28	39.41					
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773.3 752.15 751.85 15.81 19.66 22.34 24.26 777.6 750.55 750.22 MA 26.72 28.10 29.65 778.6 750.55 750.22 MA 26.72 28.10 29.65 778.6 750.55 750.22 MA 10.59 31.29 37.09 706.8 744.65 744.34 30.57 30.59 31.29 32.00 665.3 743.93 743.94 MA 10.29 31.29 32.00 775.3 761.04 760.74 37.82 36.90 39.99 41.45 775.3 761.04 760.72 38.29 36.63 38.63 40.88 776.4 777.62 777.30 3.90 4.96 5.66 6.43 770.3 744.88 744.55 34.08 35.93 36.54 37.07 770.3 744.88 744.55 34.08 35.93 36.54 770.4 777.62 777.30 3.90 4.96 5.66 6.43 770.4 777.62 777.30 3.90 4.96 5.66 6.43 770.4 777.62 777.30 3.90 4.96 5.66 6.43 770.4 777.62 760.8 760.79 34.64 35.74 37.17 39.64 771.4 739.74 739.56 28.20 29.69 30.39 31.14 771.5 760.8 760.79 38.64 36.91 38.87 41.22 666.4 761.26 761.03 40.03 37.56 39.47 41.66 771.1 748.2 741.04 21.35 21.83 22.75 24.30 772.6 741.24 741.04 21.35 21.83 22.75 24.30	3	656.6			23.82	27.60	28.38					
717.6 750.55 750.22 MA 26.72 28.10 29.65 718.6 758.79 758.56 33.98 33.86 35.55 37.49 706.8 744.65 744.34 30.57 30.59 31.29 32.00 665.3 743.93 743.94 MA MA 29.47 30.62 715.3 761.04 760.74 37.82 36.90 39.99 41.45 666.7 759.23 759.09 36.78 36.53 38.35 40.52 714.3 760.65 760.52 38.29 36.63 38.63 40.88 706.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.28 35.93 36.54 6.43 707.3 744.88 744.55 34.28 35.93 36.54 6.43 707.3 744.88 744.55 34.28 35.93 36.54 707.3 744.88 744.55 34.28 35.93 36.54 707.4 773.6 743.52 34.28 35.54 37.96 663.1 763.68 762.72 32.70 34.84 37.17 39.84 771.4 739.74 739.58 28.20 29.68 30.39 31.14 771.5 760.8 760.79 38.64 36.91 38.87 41.22 664.4 761.26 761.03 40.03 37.56 39.47 41.66 7712.1 748.22 748.08 30.82 31.23 33.19 772.6 741.24 741.04 21.35 21.83 22.75 24.30	<b>1</b>	723.3			15.81	19.66	22.34					
718.6 758.79 758.58 33.98 33.86 35.55 37.49 706.8 744.65 744.34 30.57 30.59 31.29 32.00 665.3 743.93 743.94 14A 14A 29.47 30.62 715.3 761.04 760.74 37.82 36.90 39.99 41.45 666.7 759.23 759.09 36.78 36.63 38.35 40.52 714.3 760.85 760.52 38.29 36.63 38.63 40.88 708.9 739.69 739.46 23.74 24.54 25.29 26.28 704.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.88 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 38.65 663.1 743.66 745.25 34.26 34.54 37.31 40.02 695.7 762.84 762.72 32.04 35.33 35.13 35.68 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.63 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	2	717.6			≨		28.10		•		•	
706.8 744.65 744.34 30.57 30.59 31.29 32.00 665.3 743.93 743.94 MA MA 294.7 30.62 715.3 761.04 760.74 37.82 36.90 39.99 41.45 666.7 759.23 759.09 36.78 36.53 38.35 40.52 714.3 760.85 760.52 38.29 36.63 38.63 40.88 708.9 739.69 739.46 23.74 24.54 25.29 26.26 704.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.88 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 36.56 643.7 703.8 746.16 746.29 37.18 37.46 37.96 36.56 643.7 703.8 746.16 746.29 37.18 37.46 37.96 38.65 643.1 743.46 745.25 34.28 34.24 37.31 40.02 643.1 743.46 745.22 34.28 35.24 37.31 40.02 643.1 745.1 745.2 742.87 32.84 35.33 35.95 31.14 715.0 751.37 751.29 33.43 37.56 39.47 41.22 740.88 740.22 748.08 30.63 37.56 39.47 41.65 711.2 740.22 748.08 30.63 37.56 39.47 41.65 712.1 748.22 748.08 30.64 36.51 33.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 743.48 743.29 40.04 39.82 31.23 33.19 772.1 748.22 743.04 30.04 38.22 40.09 42.08	2	718.6			33.88		35.55					
665.3 743.93 743.94 NA NA 29.47 30.62 715.3 761.04 760.74 37.82 36.90 39.99 41.45 646.7 759.23 759.09 36.78 36.53 36.35 40.52 714.3 760.85 760.52 38.29 36.63 36.63 40.88 708.9 739.69 739.46 23.74 24.54 25.29 26.26 704.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.88 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 36.65 6403.1 743.68 745.25 34.26 34.54 37.31 40.02 6403.1 743.68 745.27 32.84 35.43 37.31 40.02 6403.1 743.68 746.29 33.43 33.59 33.14 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 646.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	음	706.8			30.57		31.29					
715.3 761.04 760.74 37.82 36.90 39.99 41.45 646.7 759.23 759.09 36.78 36.53 36.35 40.52 714.3 760.85 760.52 36.29 36.63 36.63 40.88 708.9 739.69 739.46 23.74 24.54 25.29 26.26 704.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.88 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 36.65 6403.1 743.68 743.52 34.26 34.54 37.31 40.02 6403.1 743.68 743.52 34.26 34.54 37.31 40.02 6403.1 743.68 743.52 34.26 34.54 37.31 40.02 6403.1 743.68 743.52 34.26 34.54 37.31 40.02 6405.1 743.23 742.87 32.84 35.23 37.31 40.02 6405.1 743.24 762.72 32.70 34.54 37.31 39.64 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 717.2 760.8 760.79 38.64 36.91 38.87 41.22 646.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	200	665.3			¥		29.47					
646.7       759.23       759.09       36.78       36.53       38.35       40.52         714.3       760.85       760.52       38.29       36.63       38.63       40.88         708.9       739.69       739.46       23.74       24.54       25.29       26.26         704.4       717.62       717.30       3.90       4.98       5.66       6.43         707.3       744.86       744.55       34.88       35.93       36.54       37.07         703.8       746.16       746.29       37.18       37.46       37.96       36.55         703.1       743.66       746.29       37.18       37.46       37.97       38.65         720.1       743.46       746.29       37.34       37.31       40.02         643.1       743.66       742.72       32.84       35.24       37.31       40.02         770.1       743.46       762.72       32.70       34.84       37.31       40.02         695.7       762.8       762.72       32.75       36.94       30.39       31.14         715.0       751.37       751.29       33.43       31.23       31.14         715.0       761.8       761.	Ξ	715.3			37.82		39.99	_			•	
714.3 760.85 760.52 38.29 36.63 36.63 60.88  708.9 739.69 739.46 23.74 24.54 25.29 26.26  704.4 717.62 717.30 3.90 4.98 5.66 6.43  707.3 744.88 744.55 34.88 35.93 36.54 37.07  703.8 746.16 746.29 37.18 37.46 37.96 38.65  6433.1 743.68 743.52 34.26 34.54 35.13 35.68  720.1 763.23 762.87 32.84 35.24 37.31 40.02  695.7 762.84 762.72 32.94 35.24 37.31 40.02  695.7 762.84 762.72 32.90 34.54 37.31 39.64  711.4 739.74 739.58 28.20 29.68 30.39 31.14  715.0 751.37 751.29 33.43 33.59 35.95 36.38  717.2 760.8 760.79 38.64 36.91 38.87 41.22  684.4 761.26 761.03 40.03 37.56 39.47 41.66  712.6 741.24 741.04 21.35 21.63 22.75 24.30  727.3 763.48 763.29 40.04 38.22 40.09 42.08	114	686.7			86.38	•	38.35			-	•	
708.9 739.69 739.46 23.74 24.54 25.29 26.26 704.4 717.62 717.30 3.90 4.98 5.66 6.43 707.3 744.88 744.55 34.88 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 38.65 6453.1 743.68 743.52 34.26 34.54 37.31 40.02 675.1 763.23 762.87 32.84 35.24 37.31 40.02 675.7 762.84 762.72 32.70 34.84 37.31 39.84 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	12	714.3			8.3 8.3	••	38.63	•	•		•	
704.4 717.62 717.30 3.90 4.96 5.66 6.43 707.3 744.86 744.55 34.86 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 38.65 6453.1 743.66 743.22 34.26 34.54 37.31 40.02 675.1 763.23 762.87 32.84 35.24 37.31 40.02 675.7 762.84 762.72 32.70 34.84 37.31 40.02 675.7 762.84 762.72 32.70 34.84 37.31 39.84 711.4 739.74 739.56 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	13	708.9			23.78		22.23					
707.3 744.86 744.55 34.86 35.93 36.54 37.07 703.8 746.16 746.29 37.18 37.46 37.96 38.65 6453.1 743.66 743.22 34.26 34.54 35.13 35.68 720.1 763.23 762.87 32.84 35.24 37.31 40.02 695.7 762.84 762.72 32.70 34.84 37.31 40.02 695.7 762.84 762.72 32.70 34.84 37.31 39.84 711.4 739.74 739.56 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	7	7.75			3.8		5.66					
703.8 746.16 746.29 37.18 37.46 37.96 38.65 663.1 743.68 743.52 34.26 34.54 35.13 35.68 720.1 763.23 762.87 32.84 35.24 37.31 40.02 695.7 762.84 762.72 32.70 34.84 37.37 39.84 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	55	707.3			<b>8</b> .%		38.52				•	
665.1 743.66 743.52 34.26 34.54 35.13 35.68 720.1 763.23 762.87 32.84 35.24 37.31 40.02 695.7 762.84 762.72 32.70 34.84 37.17 39.84 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	13 13	703.8			37.18		37.98					
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695.7 762.84 762.72 32.70 34.84 37.17 39.84 711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 35.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 694.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	36	720.1			32.84		37.31				•	
711.4 739.74 739.58 28.20 29.68 30.39 31.14 715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	3	695.7			32.70	•	37.17				•	
715.0 751.37 751.29 33.43 33.59 35.95 36.38 717.2 760.8 760.79 36.64 36.91 38.87 41.22 626.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	107	711.4			28.20		30.39		•			
717.2 760.8 760.79 38.64 36.91 38.87 41.22 684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.08 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	5 8 8	715.0			33.43	•	35.95				•••	
684.4 761.26 761.03 40.03 37.56 39.47 41.66 712.1 748.22 748.06 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	28	717.2			38.6	•	38.87				•	
712.1 748.22 748.08 30.82 31.23 31.23 33.19 712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	6109A	4.489			40.03	• •	39.47				•	
712.6 741.24 741.04 21.35 21.83 22.75 24.30 727.3 763.48 763.29 40.04 38.22 40.09 42.08	6110	712.1			30.82		31.23		•		•	
727.3 763.48 763.29 40.04 36.22 40.09 42.08	6111	712.6			21.35		22.75					
	5112	727.3			40.04		40.09		•		•	

Top of Screen   Elevation   Elevation   Elevation   September   September   Elevation   Elevation   September   Elevation   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September   September
Boring No. Elevation 8/89 8/89 06 Apr 88 17 May 88 16 Jun 88 05 Aug 88 29 Aug 88 25 Oct 88 09 Nov 88 08 Jun  10
G113 721.4 762.29 762.22 41.27 40.80 42.16 43.70 44.44 45.55 45.66 46.1 G113A 690.0 762.85 762.89 41.88 41.65 42.96 44.48 45.14 46.25 46.37 46.8 G114 719.9 758.25 758.11 36.83 36.00 37.70 39.56 40.44 41.75 41.83 42.3 G115 715.9 729.3 729.03 15.90 16.00 18.40 19.94 20.17 20.17 20.17 20.25 16.4 G116 707.9 713.92 713.76 5.86 6.88 7.21 7.67 7.76 7.68 8.05 7.4 G116 707.9 713.92 713.76 5.86 6.88 7.21 7.67 7.76 7.68 8.05 7.4 G116 673.4 714.23 714.06 6.18 7.13 7.43 7.89 8.02 7.94 7.82 7.6 G117 707.4 723.61 723.25 14.84 15.39 15.96 16.43 16.66 17.80 16.92 16.6 G118A 677.5 718.39 718.21 9.42 9.87 10.32 11.02 11.23 11.45 11.59 11.46 G118R NA 717.93 717.61 NA NA 9.81 10.44 10.71 10.85 10.98 10.3 G119 709.5 720.44 720.22 11.95 12.27 12.88 13.51 13.80 14.02 14.13 14.4 G119 709.5 720.44 720.22 11.95 12.27 12.88 13.51 13.80 14.02 14.13 14.4 G119 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.78 14.06 14.19 14.2 G119A 674.5 720.19 720.04 12.03 12.22 12.82 13.52 13.52 13.54 22.2 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22.32 22
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G116       707.9       713.92       713.76       5.86       6.88       7.21       7.67       7.76       7.68       8.05       7.4         G116A       673.4       714.23       714.06       6.18       7.13       7.43       7.89       8.02       7.94       7.82       7.6         G117       707.4       723.61       723.25       14.84       15.39       15.96       16.43       16.66       17.80       16.92       16.6         G118A       677.5       718.39       718.21       9.42       9.87       10.32       11.02       11.23       11.45       11.59       11.4         G118R       NA       717.93       717.61       NA       NA       9.81       10.44       10.71       10.85       10.98       10.3         G119       709.5       720.44       720.22       11.95       12.27       12.88       13.51       13.80       14.02       14.13       14.6         G119A       674.5       720.19       720.04       12.03       12.22       12.82       13.52       13.78       14.06       14.13       14.6         G119A       675.3       728.06       727.69       19.66       20.53       20.88
G116A       673.4       714.23       714.06       6.18       7.13       7.43       7.89       8.02       7.94       7.82       7.6         G117       707.4       723.61       723.25       14.84       15.39       15.96       16.43       16.66       17.80       16.92       16.6         G118A       677.5       718.39       718.21       9.42       9.87       10.32       11.02       11.23       11.45       11.59       11.4         G118R       NA       717.93       717.61       NA       NA       9.81       10.44       10.71       10.85       10.98       10.3         G119       709.5       720.44       720.22       11.95       12.27       12.88       13.51       13.80       14.02       14.13       14.6         G119A       674.5       720.19       720.04       12.03       12.22       12.82       13.52       13.78       14.06       14.13       14.6         G119A       675.3       728.06       727.69       19.66       20.53       20.88       21.22       21.35       21.34       21.42       21.6         P3R       708.4       749.74       749.58       41.50       42.32       42.60 </td
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P4R     683.7     749.98     749.80     41.66     42.41     42.67     43.07     43.18     43.29     43.32     42.4       P6     692.0     740.31     739.71     24.39     25.29     26.00     26.93     27.30     27.64     27.72     27.72       P7     20.20     20.76     21.36     21.81     22.02     22.21     22.32
P6     692.0     740.31     739.71     24.39     25.29     26.00     26.93     27.30     27.64     27.72     27.72       P7     20.20     20.76     21.36     21.81     22.02     22.21     22.32
P7 20.20 20.76 21.36 21.81 22.02 22.21 22.32
P9 749.12 748.67 NA NA 20.20 22.13 23.03 24.62 25.01
MM-101 NA NA NA 69.00 71.47 71.88
NA NA 26.24 28.91 29.77 32.47 35.4
NH-103 751.65 751.17 NA 17.16 18.38 20.68 21.81 23.97 24.45 25.5
MM-104 757.16 756.72 NA NA 28.92 30.77 31.61 33.18 33.52 34.3
MM-105 684.7 753.47 752.82 17.93 22.56 25.87 28.40 29.27 30.92 31.22 31.0
MM-106 674.7 727.47 725.89 18.13 18.76 19.07 19.43 19.54 19.99 21.10 19.3
MM-107 750.62 749.78 NA NA 27.27 29.28 30.26 33.04 32.47 34.1



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July 12, 1985 C 11684 13/60

Mr. Chuck Howard Winnebago Reclamation Services, Inc. 4920 Forest Hills Road Loves Park, IL 61105

Re: Groundwater Level Monitoring

Winnebago Reclamation Service Inc. Landfill

Dear Mr. Howard:

Please find enclosed recent water-level data collected from groundwater monitoring wells on and around the Winnebago Reclamation Service Inc. Landfill. The data has been used to develop water table maps to illustrate changes in flow configuration. Also enclosed are vertical gradients calculated from the water-level observations. This data is presented in the same format as the groundwater level measurements and vertical gradient calculations in Appendix E of our recent report "Supplemental Investigation - Winnebago Reclamation Landfill, Rockford, Illinois", dated March 5, 1985. The data can be considered a supplement to the information contained in that report.

Groundwater level measurements were collected on March 4, April 4, May 2, and May 30, 1985. In the course of collecting the groundwater level measurements, significant observations were noted by our field technicians. They are as follows below:

March 4, 1985

Heavy precipitation and runoff were noted during the collection of levels. The intermittent tributary to Killbuck Creek which runs across the ACME Solvents site was noted to be overflowing the banks with Monitoring Wells G-101, MW-103, P-8 and P-9 being inundated with water backed up from the creek. At a 52-inch diameter culvert upstream from Monitoring Wells B-16 and B-16A, an estimated flow of 133 cubic feet per second was noted. A marked drop off in the flow was noted downstream from Monitoring Wells B-16 and B-16A. Portions of the road across the ACME Solvent's property were noted to have been washed away. Several empty 55-gallon drums were observed in the Creek bed.

Mr. Chuck Howard
Loves Park, Illinois

#### April 4, 1985

Some rain occurred during the collection of the water levels. Runoff was observed to be minimal. The intermittent tributary to Killbuck Creek at ACME Solvents was observed to be dry in the upper reaches (east of MW-103). Just downstream of MW-103, two underdrains were observed discharging into the creek. Flow was noted in the creek from that location to near the culvert at B-7. Downstream from B-7 no flow was observed and the stream bed was noted to have been highly scoured with bedrock being exposed. Apparently during times of high-stream flow, the stream flows directly on the bedrock surface.

#### • May 2, 1985

The intermittent tributary to Killbuck Creek had little flow from where it merged with the underdrains near MW-103 to the bridge (culvert) near B-7. No flow was observed downstream of B-7. Monitoring Well B-15R has apparently been hit by equipment and was tilted at a 45-degree angle. A water level was obtained from B-15R, but it will be impossible to obtain a sample from this well in the future if it is not repaired.

#### May 30, 1985

Flow conditions in the intermittent tributary were similar to those noted on May 2, 1985.

The collection of groundwater levels on March 4, 1985 coincides with a major recharge event. The water-level data from March 4, 1985 had 20 of the monitoring wells with the highest groundwater levels noted to date by Warzyn personnel. Preparation of a water table map from levels collected on March 4, 1985 indicate a large groundwater mound in a triangular area roughly defined by Monitoring Wells B-7, B-9 and P-8. The mounding associated with the apparent rapid recharge of the aquifer by the tributary to Killbuck Creek increased the horizontal gradients between Monitoring Wells B-9 (at edge of ACME Solvents) and B12 (at the edge of Winnebago Reclamation Landfill) from approximately 0.0017 foot per foot on January 15, 1985 to 0.0143 foot per foot on March 4, 1985. The noted increase in the horizontal gradients immediately upgradient of the Winnebago Reclamation Services Inc. Landfill should act to significantly decrease transport time of any contaminants emanating from ACME Solvents and migrating toward Winnebago Landfill. In addition, the large amount of relatively clean recharge water from the tributary may act to break up the contaminant plume.

The difference in March 4 water table elevations between Monitoring Well G-109, which is located immediately adjacent to the edge of refuse at the Winnebago Reclamation facility, and Monitoring Well B-12, located approximately 100 feet (south) from the facility, was significant. The water table at Monitoring Well G-109 was 0.88 feet higher than the water level at nearby Monitoring Well B-12. This compares to a difference in levels of 0.26 feet on January 15, 1985. After periods of recharge, groundwater mounding beneath a landfill



Mr. Chuck Howard
 Loves Park, Illinois

tends to increase in magnitude. The observations of March 4, 1985 could be construed to represent mounding of groundwater due to leakage through the landfill liner. However, there is typically a lag period between recharge events and increased mounding beneath a landfill. The increased gradient from G-109 to B-12 could be attributable to previous recharge events. Alternatively, the relatively higher water level at G-109 may be attributed to an increase of recharge at the edge of the site from runoff channelled off of the site. It is possible that both are contributing to mounding. An absolute determination of why gradients increased at the edge of site cannot be made with available data. No other anomalies in groundwater flow were noted that would confirm mounding associated with the landfill.

Vertical gradients on March 4 at the nested monitoring wells, except at nests B-11/B-11A, P-3/P-5 and P-4/P-5, were of similar direction and magnitude, compared to previous observations. At nests P-3/P-5 and P4/P-5, the vertical gradients reversed themselves and were downward. This is probably due to the recharge conditions associated with the heavy precipitation events during and previous to these water level measurements. The switch in vertical gradients from generally downward to upward at Piezometer Nest B11/B-11A may indicate the severity of the mounding associated with intermittent creek is somehow acting to induce upward flow at a distance away from the mound. Switching of vertical gradients coupled with intense recharge events may account for the spotty nature of contaminants in the shallow groundwater (e.g., contaminants at ACME Solvent are recharged, and then flow upward at a distance away from the groundwater recharge mound).

The April 4, 1985 data was also collected during a period of apparent ground-water recharge. On April 4, 1985, an additional 20 of the monitoring wells had the highest groundwater levels recorded by Warzyn personnel. There is no similarity in the wells which recorded groundwater highs on March 4 compared to April 4. However, wells which were at highs on March 4 generally only showed slight decreases on April 4, 1985. Levels in most wells are significantly higher than the observations included in our March 5 report.

The April 4, 1985 levels show a significantly different groundwater recharge pattern than noted on March 4, 1985. The April levels delineate a groundwater mound which is linear and is defined by Monitoring Wells B-7, B-4 and MW-103. The watertable drops off rapidly to the southwest, with lesser horizontal gradients to the north and northwest. The relatively high horizontal gradients noted immediately upgradient of Winnebago Reclamation Services Inc. Landfill decreased by April 4, 1985 to the point where they were similar to observations noted in our report. The difference in water table elevations between Monitoring Well G-109 and B-12 was only 0.02 feet.

On April 4, 1985, deviations from previous observations of vertical gradients were noted at Piezometer Nests B-6S/MW-105 and at B-11/B-11A. The vertical gradients at Nest B-11/B-11A switched from upward back to downward between March and April, with the downward gradients being much greater than previously value observed. Vertical gradients at B-6S/MW-105 switched from upward to downward, indicating recharge conditions can change vertical gradients at the ACME Solvents site and enhance downward migration of contaminants.



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Mr. Chuck Howard Loves Park, Illinois

The groundwater levels collected in May, 1985 were generally lower than those collected in March and April, and probably represent a transition period from recharge back to the normal groundwater flow conditions. The May 30, 1985 levels are generally lower than the levels of May 2, 1985, but are higher than the January 15, 1985 levels. Due to the similarity in flow patterns between the May 2 and May 30 levels, a water table map was only prepared for the May 2, 1985 data. The water table configuration noted on May 2, 1985 is similar to that noted in April, with a groundwater mound being generally linear between Monitoring Wells B-7, B-4 and MW-103. On May 2, the horizontal gradient between Wells G-109 and B-12 was observed to be reversed, with Monitoring Well B-12 having a water table elevation approximately 0.11 feet higher than G-109.

Overall, the groundwater flow pattern downgradient of the landfill was not significantly different than any of the previous observations. In May, 1985, groundwater recharge events apparently have a much greater influence on groundwater flow configuration on the ACME Solvent property than on areas downgradient of Winnebago Reclamation Services, Inc. Landfill. This may be attributable to the shallow depth to bedrock and the immediate recharge of the aquifer due to flow through fractures and/or voids.

Vertical groundwater flow direction noted at nested wells on May 2, 1985, was generally consistent with observations from our March 5, 1985 report, However, the gradients values were significantly higher than observations noted in our report, at Piezometer Nest B-6S/MW-105, B-10/B-10A and B-11/B11A.

Vertical gradients on May 30, 1985 were generally similar to those noted May 2. Downward gradients were again noted at Nest B-6S/MW105. Of more significance is the detection of upward vertical gradients at Nest G109/G109A. The detection of upward gradients at the immediate edge of the landfill lends credence to the hypothesis that contaminants from ACME may be flowing upward beneath the landfill site.

Below is a summary of the apparently significant aspects of the groundwaterflow system noted in the vicinity of Winnebago Reclamation Services Inc. Landfill:

- Large amounts of recharge into the groundwater system apparently are attributable to the intermittent creek flowing across the ACME Solvent site. This recharge may tend to break up the contaminant plume and move contaminants already in the aquifer west of ACME Solvent at an accelerated rate.
- Significant downward vertical gradients were noted on the ACME Solvent site. Upward vertical gradients at locations west of the facility were also noted, which normally have downward vertical gradients. The combination of strong downward gradients at the ACME site and temporary upward gradients at a distance from the site could provide the mechanism for transport of the contaminants at depth away from ACME Solvents, with the reemergence of the the contaminants at a higher point in the aquifer closer to Winnebago Reclamation Services Inc. Landfill.



Mr. Chuck Howard Loves Park, Illinois

Runoff from the ACME Solvents site was observed to be in direct contact with bedrock in the creek bed north of the site.

The observations and data collected indicate the groundwater flow system upgradient of Winnebago Reclamation Services, Inc. is highly variable. The variablility in the flow supports Winnebago Reclamation Services, Inc. contention that ACME Solvents is the primary source of organic contamination beneath the landfill.

The collection of additional groundwater elevation data is worthwhile. We have already obtained significant insights into the groundwater flow system. We will continue groundwater level monitoring on a monthly basis, per our recent discussion.

We also suggest that Monitoring Well B-15R be repaired. Our technicians will repair this monitoring well concurrent with the collection of the next set of groundwater levels, if possible, with your authorization.

If you have any questions or comments about the data contained in this letter, please feel free to contact us.

Sincerely,

WARZYN ENGINEERING INC.

James A. Hill Hydrogeologist

Daniel W. Hall, CPGS

Janiel W. Hall

Project Manager

JAH/DWH/nac/DRV [nac-3-34]

Encls: Groundwater Level Observations

Groundwater Flow Maps 03/14/85, 04/04/85 and 05/02/85

(Drawing C 11684-B5 through -B7)

cc (w/encls.): Mr. Ridgeway M. Hall, Jr. - Crowell & Moring

Mr. John Holstrom



#### APPENDIX E SUPPLEMENT REBULTS OF GROUNDWATER LEVEL MEASURMENTS WINNEBARD RECLAMATION SERVICE LANDFILL

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# APPENDIX F PREVIOUS REPORTS

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Time After Drilling Depth to Water

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Depth to Cave in

#### LOG OF TEST BORING

NRG

Boring No. SB-1 Surface Elevation ___721.4__ Job No. 60741

Logger SB Editor SB

Drill Method

Location Winnebago County, Illinois Sheet 1 of 1 2100 CORPORATE DRIVE ADDISON, 1160101 TEL (312) 691-5000 SOIL PROPERTIES SAMPLE VISUAL CLASSIFICATION sive VOC tox (de) Rec and Remarks Moist Depth KNU No. (in.) Gas Water Gray Silty CLAY, Trace Fine to Coarse Sand 18 M 14 82 15 M Brown Fine to Coarse SAND and GRAVEL, Trace Silt & Clay Brown Fine to Coarse SAND, Trace Fine 3 18 W 77 Gravel, Trace Clay BEDROCK End Boring at 20' 30-WATER LEVEL OBSERVATIONS **GENERAL NOTES** While Drilling Start 10/4/89 End 10/4/89 Upon Completion of Drilling Driller ETI Chief GS Rig CME

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### **LOG OF TEST BORING**

Project NRG

Boring No. ___SB-2_ Surface Elevation 721.4 Job No. _____60741 ____ Sheet ___1__of __1___ Location Winnebago County, Illinois

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### LOG OF TEST BORING

Project NRG Surface Job
Location Winnebago County, Illinois She

Boring No. SB-3
Surface Elevation 736.0
Job No. 60741
Sheet 1 of 1

2100 CORPORATE DRIVE ADDISON, 1160101 TEL (312) 691-5000

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#### LOG OF TEST BORING

Project NRG

Location Winnebago County, Illinois

Boring No. SB-4
Surface Elevation 738.2
Job No. 60741
Sheet 1 of 1

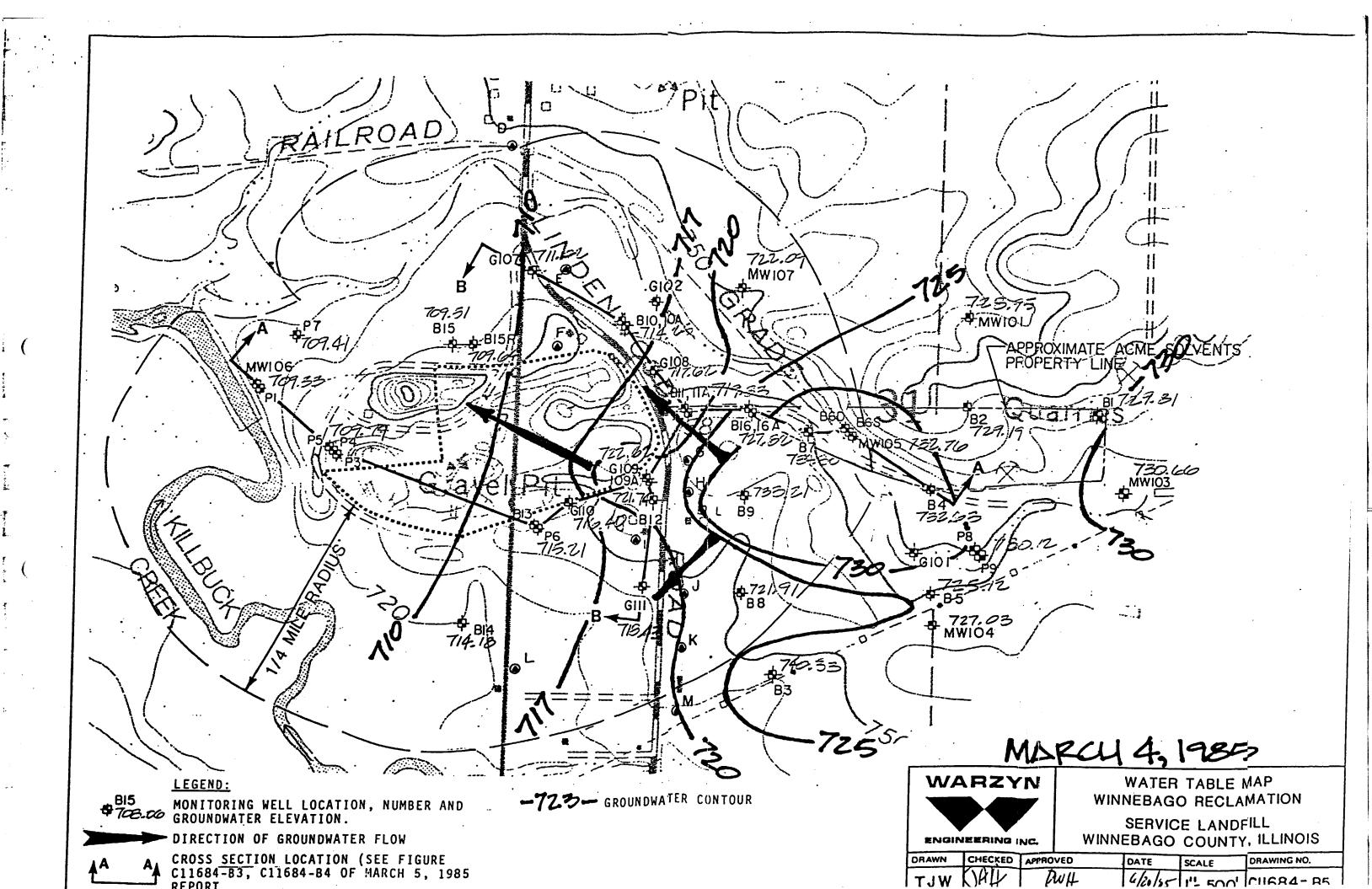
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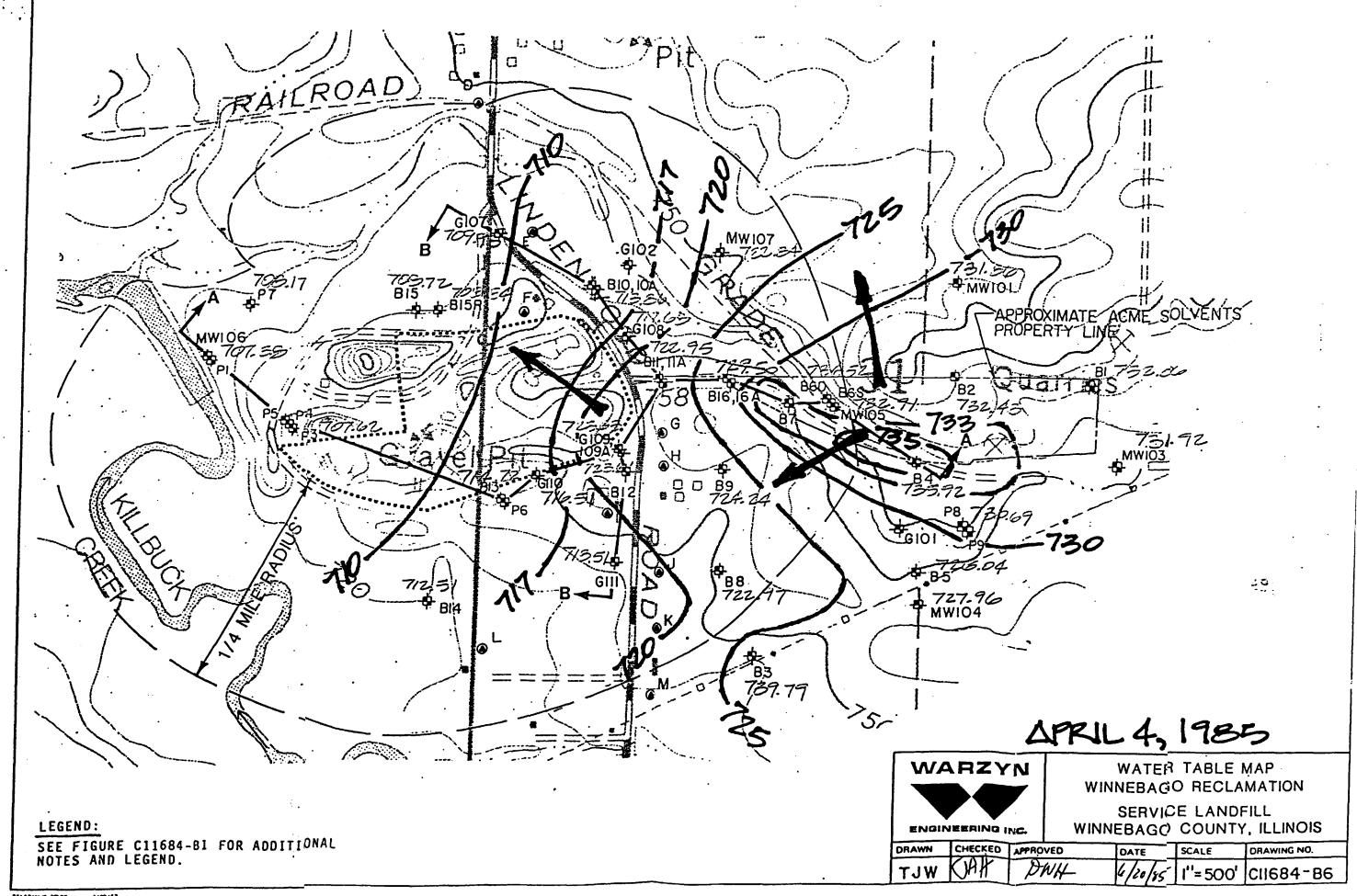
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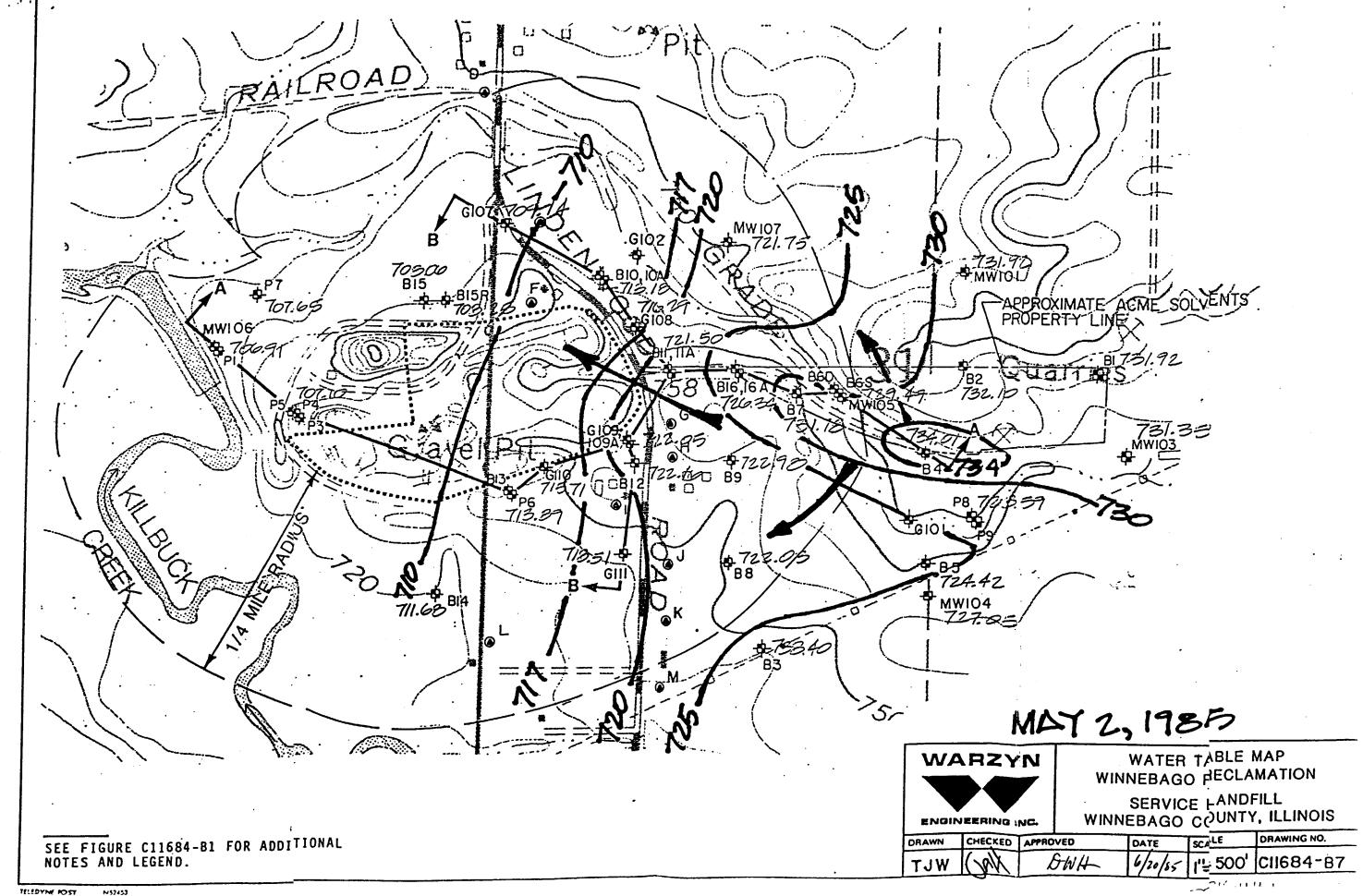
Depth to Water

Depth to Cave in

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.









Engineers & Scientists
Encirinmental Services
Waste Management
Water Resources
Site Development
Special Structures
Georg Innight Analysis

July 18, 1986 C 11684 /3/60

Mr. Charles Howard Winnebago Reclamation Services, Inc. 4920 Forest Hills Road Loves Park, IL 61105

Re: Groundwater Level Monitoring Pagel's Pit Landfill

Dear Mr. Howard:

With Remedial Investigation activities soon to start at Pagel's Pit Landfill (Winnebago Reclamation Services, Inc.), a summary of groundwater level monitoring results to date has been prepared. Groundwater level monitoring was initiated in December, 1984 and continued until May, 1986 on a monthly basis. Attached is a summary of all calculated groundwater elevations and vertical groundwater gradients. The groundwater monitoring data from December 1984 and January 1985 were discussed in our report entitled "Supplemental Investigation Winnebago Reclamation Landfill, Rockford, Illinois" (March 5, 1985). Groundwater monitoring results from March, April and May of 1985 are discussed in a letter dated July 12, 1985. This letter provides an evaluation of groundwater flow monitoring between July 2, 1985 and May 7, 1986 and is intended to supplement previous assessments. Monthly groundwater level monitoring will resume with initiation of the Remedial Investigation activities.

Groundwater generally flows east to west in the vicinity of the landfill. The flow direction places Acme Solvents upgradient of the landfill. Flow direction within the general east to west flow regime varies considerably. The flow configurations relate to the occurrence (or lack) of recharge to the shallow bedrock aquifer by the intermittent waterway which crosses the Acme Solvents facility. The following is a brief description of conditions observed in the creek during measurements and interpreted groundwater flow patterns:

- July 2, 1985 The waterway across the Acme Solvents facility was observed to have very low flow. A non-recharge groundwater flow configuration was interpreted.
- July 30, 1985 No flow was observed in the waterway across the Acme Solvents facility. A non-recharge groundwater flow configuration was interpreted.

- September 6, 1985 Very low flow was observed in the intermittent waterway across the Acme Solvents facility. A non-recharge groundwater flow configuration was interpreted.
- October 1, 1985 No on flow in the creek was observed. A non-recharge groundwater flow configuration was interpreted. Drawing C 11684-86 is a water table map based on the October 1, 1985 data.
- November 6, 1985 Heavy flow was observed in the intermittent waterway on the Acme solvents site. The groundwater flow configuration is that of a recharge pattern with a groundwater mound adjacent to the creek (defined by wells B-4, B-7 and Nest B-6S/B-6D/ MW105), and increased horizontal gradients west of the creek. The flow pattern was similar to recharge conditions in Spring 1985, as documented in our July 12, 1985 letter.
- December 5, 1985 Extremely heavy flow was noted in the intermittent waterway which crosses the Acme Solvents site. The groundwater flow configuration is indicative of recharge conditions. A groundwater mound centered around monitoring wells B-4, B-7 and Nest B-6S/ B-68/ MW-105 was interpreted. Drawing C 11684-B7 illustrates groundwater flow for December 5, 1985.
- January 9, 1986 The intermittent waterway was observed to be approximately 90% covered with ice and snow. One to two feet of snow was observed on the ground. The groundwater flow configuration was typical of non-recharge flow conditions.
- February 7, 1986 Some flow was observed in the intermittent waterway crossing the Acme Solvents site. Snow was on the ground. Groundwater flow configuration was such that no groundwater mounds were associated with the intermittent waterway.
- March 3, 1986 Low flow was observed in the intermittent waterway crossing the Acme Solvents site. The groundwater flow configuration was typical of non-recharge flow conditions.
- April 4, 1986 Some flow was observed in the intermittent waterway. A slight mound was interpreted in the vicinity of Monitoring Well B-4, with increased horizontal gradients noted between Monitoring Wells B-7 and B-16. The groundwater flow conditions are probably a transition from a recharge event between the March 3 and April 4, 1986 readings. Recharge could have been induced by heavy rainfall or snowmelt. Drawing C 11684-B8 presents the groundwater flow configuration on April 4, 1986.
- May 7, 1986 No flow was observed in the intermittent waterway. A slight groundwater mound was noted between Monitoring Wells B-4 and B-7. Horizontal gradients west of the mound were steeper than normally observed. The increased horizontal gradients could be residual effects from recharge by the intermittent waterway.



July 18, 1986 C 11684

Groundwater levels in the immediate vicinity of the landfill and Acme Solvent sites apparently respond substantially to recharge of the aquifer by the intermittent waterway which flows across the Acme facility. Recharge to the groundwater is a normal seasonal condition which usually occurs in fall and spring, when precipitation or snowmelt contributes to groundwater and raises water table.

The highest water levels noted during monitoring were found on December 5, 1985 at all wells, except MW-101 and MW-103, which had their highest observed levels on January 9, 1986. In contrast, the lowest observed levels were noted on October 1, 1985 at most monitoring wells. The October 1, levels are generally lower because it follows a period when infiltration is comparatively low and water usage by plants and evaporation is high. As a result, low flow or no flow was observed in the waterway between the two sites. Those wells with lower levels than on October 1, 1985 were Wells B-3 (July 30, 1985), G-110 (September 6, 1985), and MW-107 (December 27, 1984).

Attached are plots of groundwater levels over time (hydrographs) for wells B-4, B-6S, B-9, B-10A B-15, MW-102, MW-105, G-107, G-109 and G-109A. Wells B-4, B-6S and MW-105, located immediately adjacent to the intermittent waterway in the area, typically show groundwater mounding when recharge events occur. These wells indicate water level fluctuations up to about 12.5 feet. The water level changes follow the pattern of recharge events in the spring and winter, with decreasing levels in late winter and summer months. Well MW-102, the furthest upgradient monitoring point adjacent to the intermittent waterway, shows similar but lesser fluctuations (approximately 9.5 feet).

Wells G-109 and G-109A, a piezometer nest located immediately adjacent to the southeast corner of the landfill, is upgradient of the landfill and downgradient of Acme Solvents site. The well hydrographs exhibit fluctuations similar to those at wells adjacent to the intermittent waterway. The differences between high and low levels are approximately 9-1/2 feet.

Monitoring Wells G-107 and B-15, screened in the sand and gravel soils on the north side of the landfill, show smaller water level fluctuations. However, the level changes appear to be correlated to the recharge conditions caused by the intermittent waterway on the Acme site. Well B-15 had water level fluctuations of approximately 3-1/2 feet, while Well G-107 had fluctuations of approximately 4-1/2 feet.

Changes in the well hydrographs indicate recharge by the intermittent creek crossing the Acme solvents facility influences the groundwater flow configuration. The well hydrographs also indicate that recharge events have the greatest influence on water levels in wells immediately adjacent to the waterway. Other wells located further away or upgradient from the creek showing familiar, but lesser fluctuations, are influenced by areal recharge (through soils by precipitation). Steeper hydraulic gradients west of the waterway are likely influenced by surface water recharge, as well as areal recharge, during times of heavy precipitation and/or snowmelt.



The summary of groundwater levels also contains calculated vertical gradients at nested monitoring wells. The following observations on vertical gradients were noted:

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- MW-105/B-6S/B-6D Upward gradients were observed except for November 6, 1985 and April 4, 1986. Major recharge events were noted on those dates. With the proximity of the wells to the intermittent waterway, recharge by the waterway appears to reverse the vertical gradients on occasion.
- Nests B-10/B-10A and G-109/G-109A Nests with both wells installed in bedrock were observed to have consistently upward gradients.
- B-11/B-11A Was observed to have consistently downward gradients.

  Both wells in the nest are installed in the bedrock aquifer.
- Nest 8-13/P-6 Was observed to have downward horizontal gradients except on July 30, 1985, when a slight upward gradient was noted.
- Nest P-1/MW-106 Installed adjacent to Killbuck Creek and shows alternating upward and downward gradients. The magnitude of calculated gradients vary slightly at this nest. The gradient reversals may indicate that Killbuck Creek switches from being a groundwater discharge point during low creek flow to a recharge source during high flow.

The vertical gradients calculated from the period of July 2, 1985 through May 7, 1986, indicate that very slight upward gradients are generally present in the bedrock aquifer. Downward gradients in the bedrock are associated with recharge events at the intermittent waterway which crosses the Acme Solvents site.

The location of the waterway between the two sites and its relation to recharge of the aquifer, in this unique setting, will be a significant factor in the interpretation of water quality/water level data gathered during the Remedial Investigation. It is important to note that field observations indicate that portions of the waterway between the two facilities lie directly on bedrock. As a result, surface water flows directly over bedrock allowing for rapid recharge of the bedrock aquifer. Because creek flow is likely to have fairly good water quality, it may have impacts on contamination plume characteristics during recharge events. For instance, as previously hypothesized by Warzyn, the creek recharge may dilute and break up the contaminant plume eminating from the Acme Solvent site. Further, contaminants may move deeper in the aquifer, due to the downward vertical gradients during recharge. The hypothesis was partially supported by interpretation of the water quality data presented in the Supplemental Groundwater Investigation. The hypothesis is further supported by the analysis of this subsequently collected groundwater level data.

In summary, the groundwater flow conditions at and adjacent to Pagel's Pit Landfill indicate a bi-annual recharge event; in the spring and late fall of each year. The recharge events substantially increase water levels



Mr. Charles Howard Loves Park, Illinois

adjacent to the intermittent waterway which crosses Acme Solvents, and steepen the water table to the west (downgradient). The recharge also changes vertical flow from generally upward to downward, in direct response to recharge.

The groundwater recharge may move contaminants downward in the aquifer. The recharge of groundwater with relatively clean surface water may dilute and/or breakup any contaminant plume associated with releases from the Acme Solvents facility.

We suggest this data be submitted to the U.S. EPA and/or incorporated into the Remedial Investigation. The monthly collection of the water level measurements has provided data which strengthens our understanding of the relationship between the intermittent waterway and groundwater flow patterns in the area.

Sincerely,

WARZYN ENGINEERING INC.

James A. Hill Project Hydrogeologist

Daniel W. Hall, CPGS Project Manager

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Enclosures: Drawings C 11684-8-6 through 8-8

Hydrographs

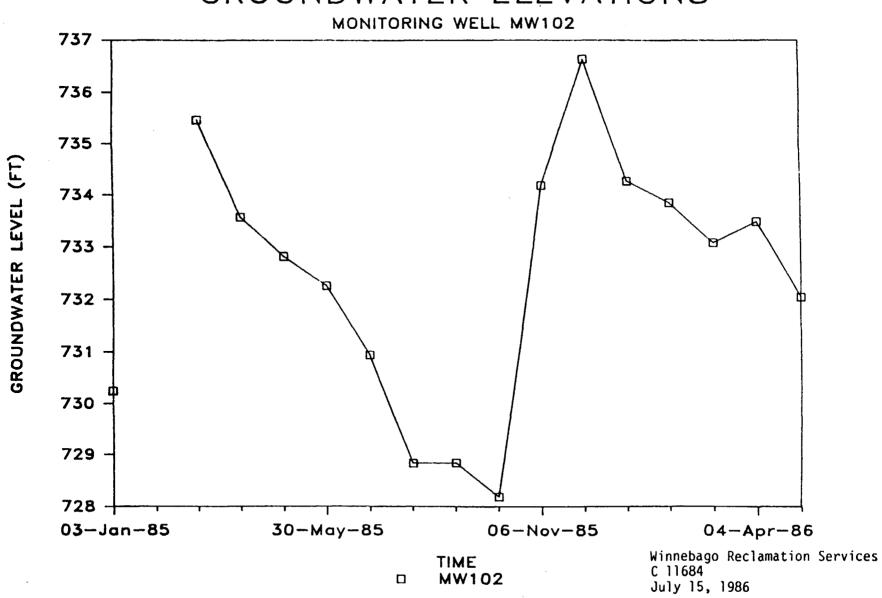
Groundwater Levels and Vertical Gradient Observations

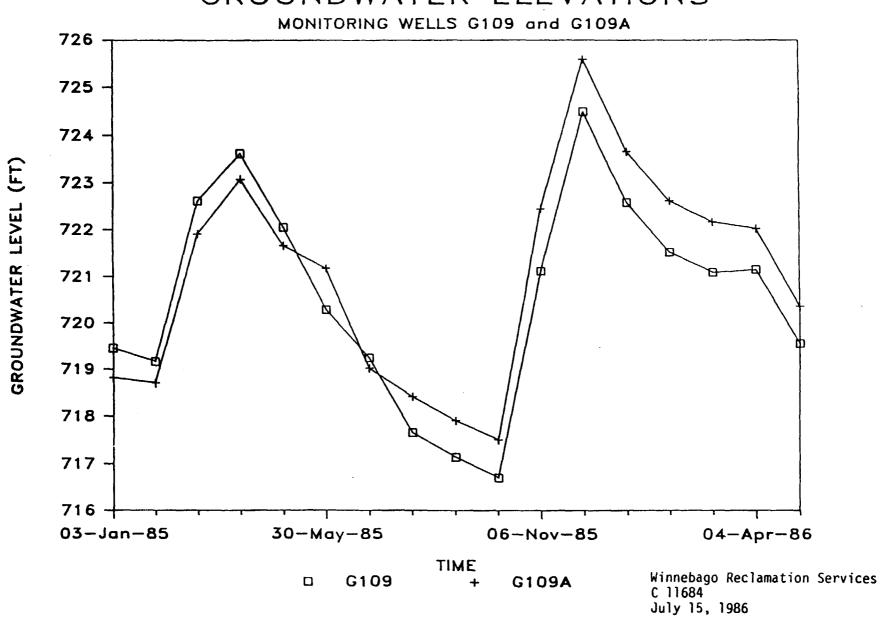
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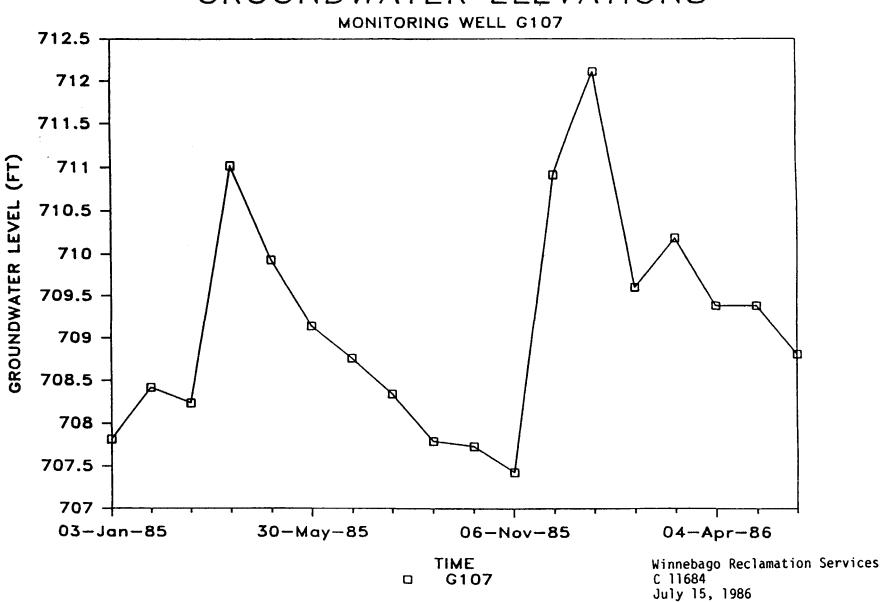
Mr. John Holmstrom - Holmstrom & Green

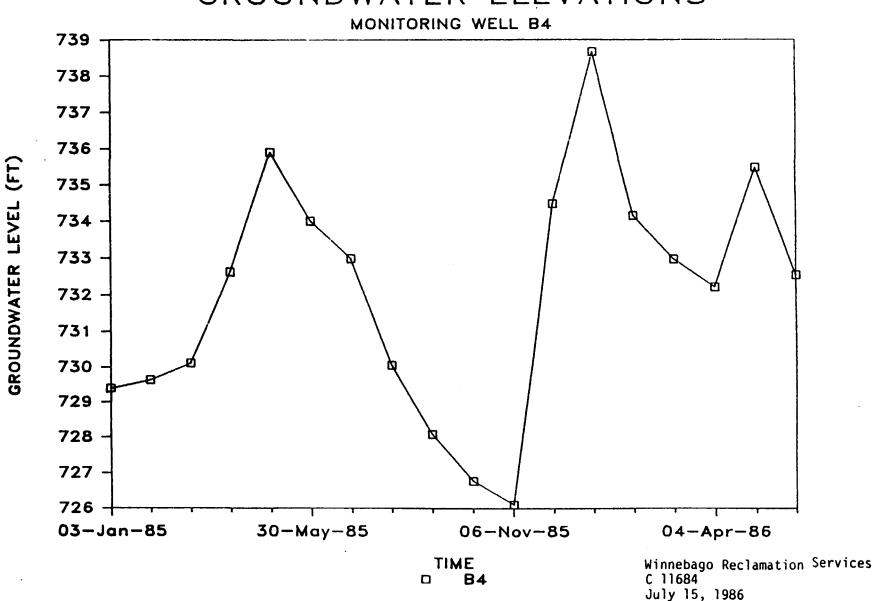
Mr. Gary Marzorati - Winnebago Reclamation Services, Inc.

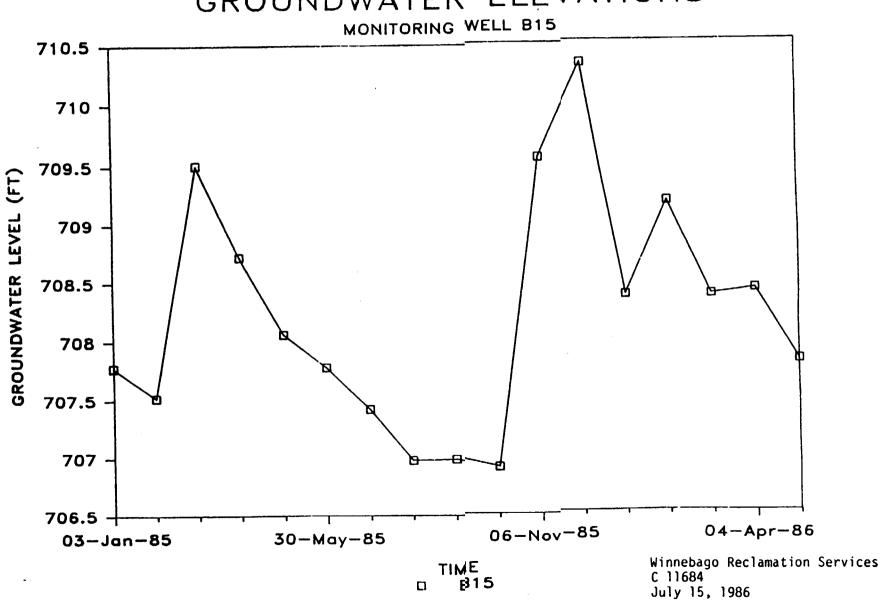


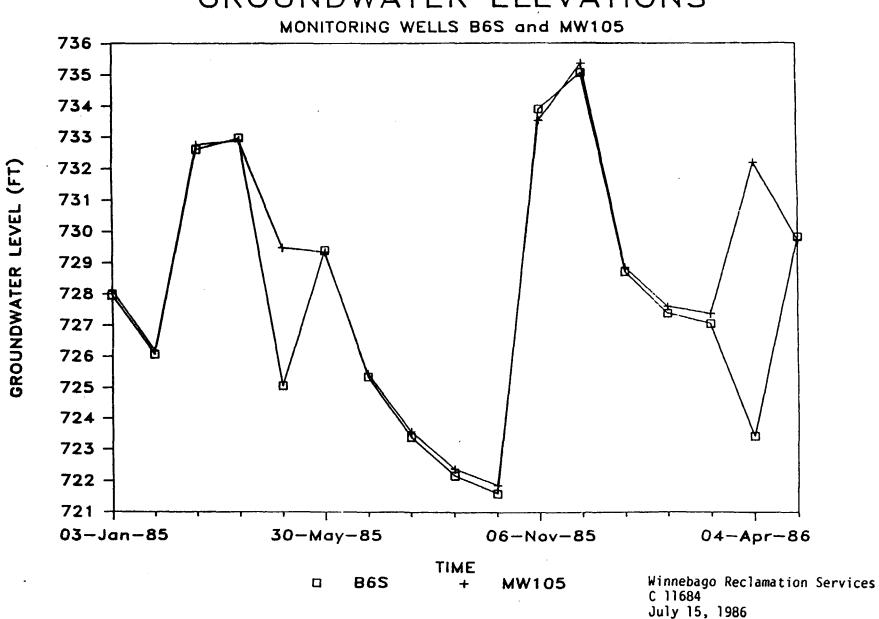


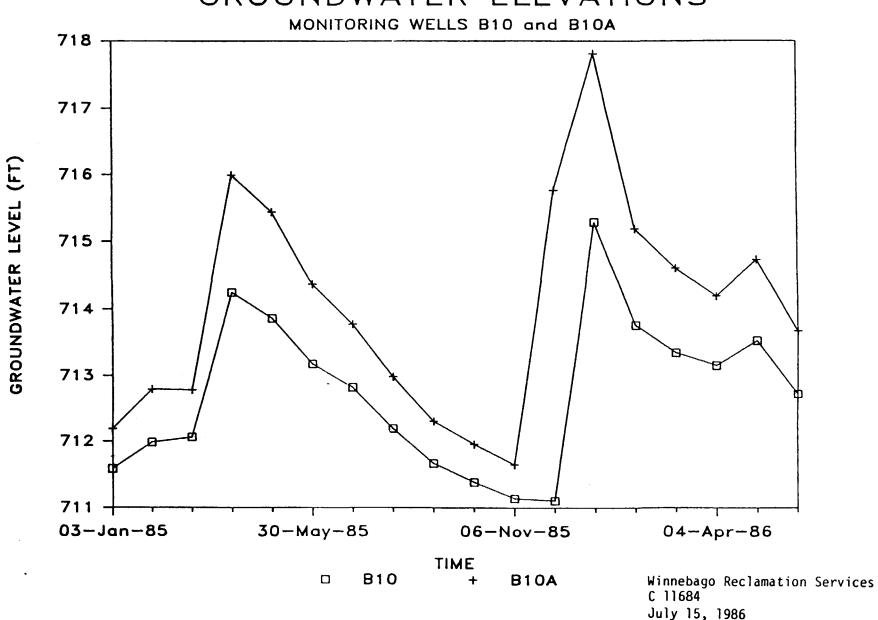








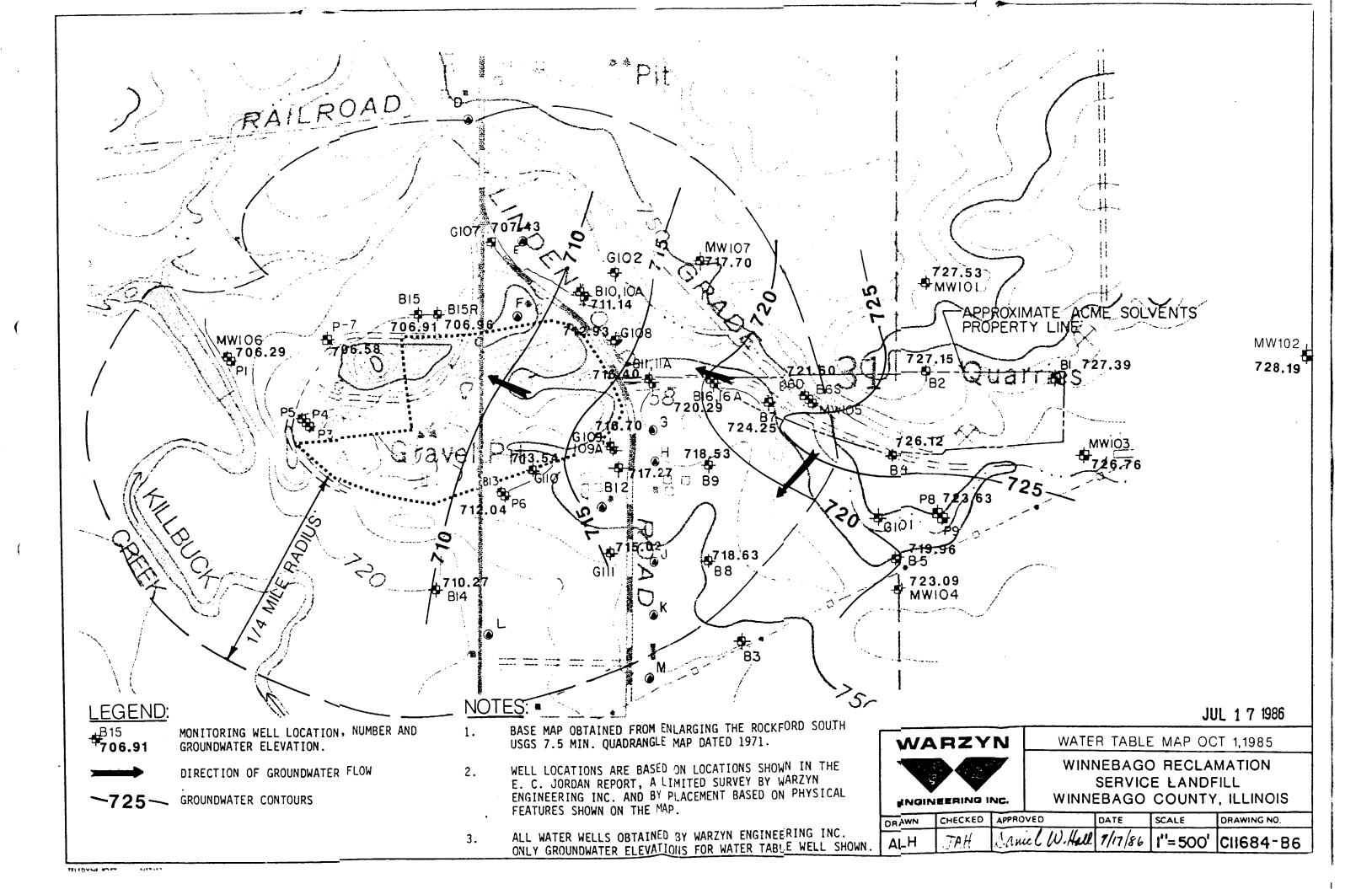




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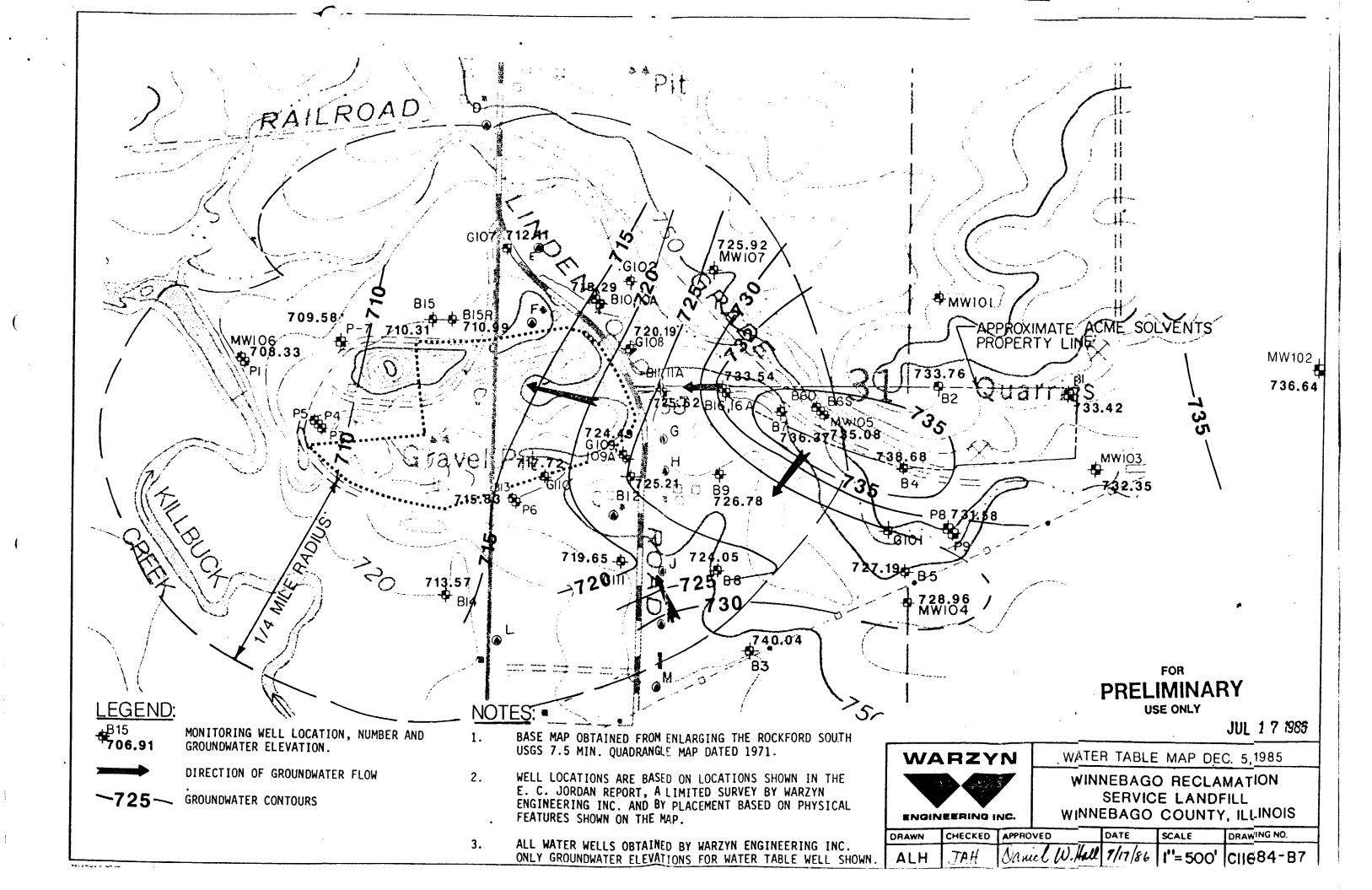
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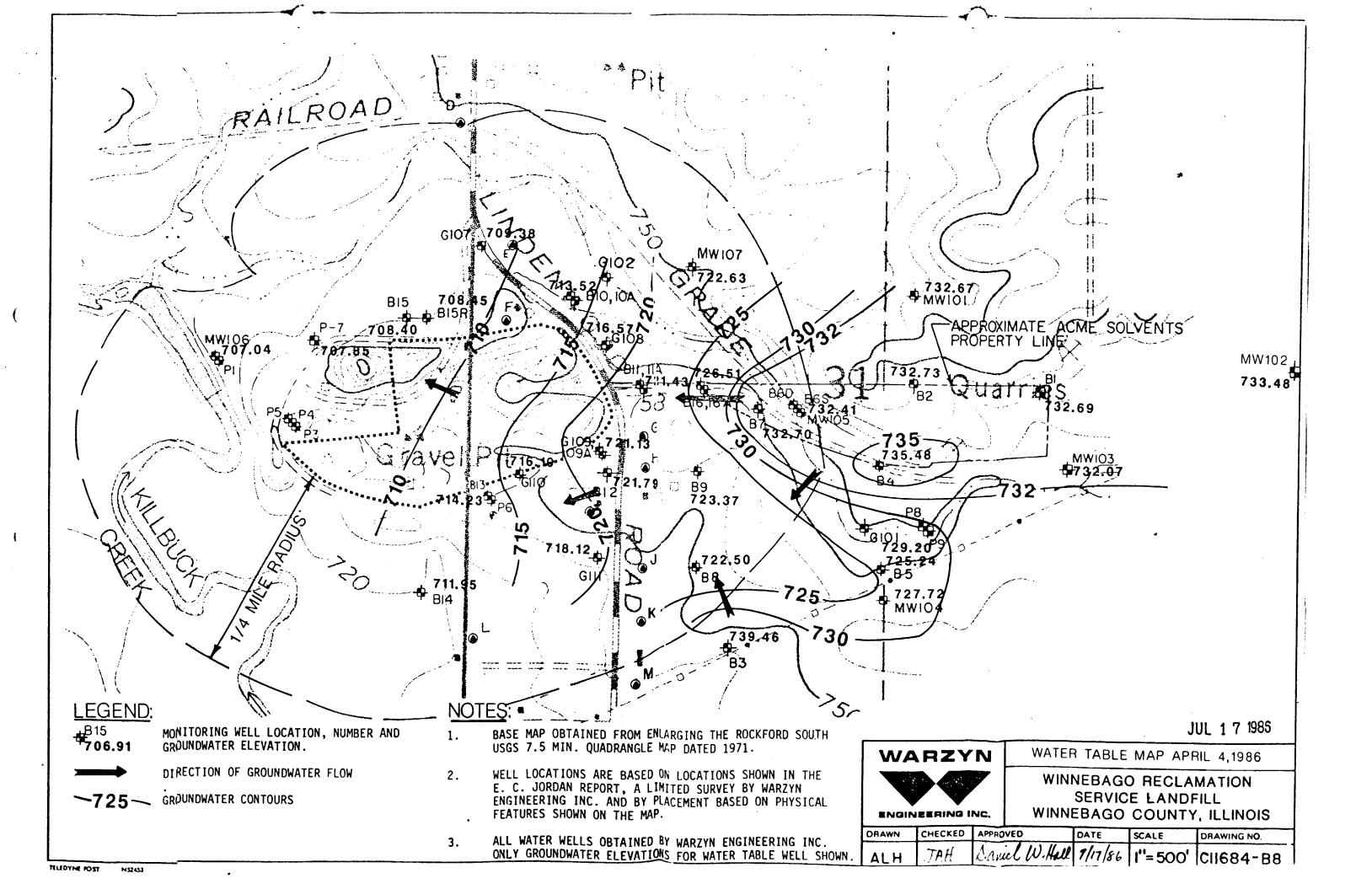
ALL DEPTH MEASURMENTS FROM TOP OF THE INNER WELL CASING *FROM MODIFYED TOP OF CASING 746.16



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HELL NEST	SEAL	SCREEN NTW				
865-MW105 B10-B10A B11-B11A B13-P6 B16-B15A G109-G109 MW106-P1 P3-P4	687.20 691.10 693.50 699.60 A 688.90 577.65 688.40	636.90 725.00 728.58 716.43 737.54 722.90 698.30 709.80	0.0076 0.0522 -0.0423 -0.0201 0.0340 0.0005	0.0110 0.0430 -0.0339 -0.0229 0.0339 0.0019	-0.0082 0.0498 -0.0284 -0.0235 0.0273 0.0029	-0.0031 0.0375 -0.0101 -0.0224 0.0258 -0.0015
P3-P5 P4-P5 P8-P9	667.60 667.69 700.80	709.30 688.40 715.72	-0.0007	0.0000	-0.0027	0.0007

ALL DEPTH MEASURMENTS FROM TOP OF THE INNER WELL CASING *FROM MODIFYED TOP OF CASING 746.16





# APPENDIX G USGS STREAMFLOW DATA



### United States Department of the Interior





4th Floor 102 East Main Street Urbana, IL 61801 May 25, 1989

Mr. Bernard Schorle
Remedial Project Manager
U.S. Environmental Protection Agency
Region V, Mail Stop 5HS-11
230 S. Dearborn Street
Chicago, IL 60604

RECEIVED.

MAY 31 1989

WARZYN-KLINOIS

Route Hampan File Courant

Dear Bernard:

Enclosed please find two copies of stream flow and water-quality data for Killbuck Creek south of New Milford from October 1987 to September 1988. These data show that the rate of streamflow during the April sampling round at Pagel's Pit was significantly higher than during the rest of the year. These data also show that the rate of streamflow during the June sampling round at Pagel's Pit was probably more or less normal. There does not appear to be any significant change in the water quality of the creek during the April sampling round except that turbidity, nitrogen, and total residue are high and fecal coliform is low. The concentration of barium ion cited in this report is in good agreement with the concentration measured by Warzyn.

Please pass on one of these copies to Jim Hill at Warzyn. Feel free to call me at FTS 958-5368 with any questions or comments.

Sincerely,

Robert Kay Hydrologist

Enclosures cc: Nicholas Avery



## Water Resources Data Illinois Water Year 1988

Volume 1. Illinois except Illinois River Basin



U.S. GEOLOGICAL SURVEY WATER DATA REPORT IL-88-1
Prepared in cooperation with the State of Illinois
and with other agencies

#### 05440520 KILLBUCK CREEK NEAR NEW MILFORD, IL

LOCATION. -- Lat 42°09'36", long 89°04'32", in SW1/4NW1/4 sec.35, T.43 N., R.1 E., Winnebago County, Hydrologic Unit 07090006, at bridge on State Highway 251, 1.7 mi south of New Milford, 12.8 mi downstream from Spring Run, and at mile 2.4.

DRAINAGE AREA. -- 136 mi 2.

PERIOD OF RECORD. --Water years 1979 to current year. Additional chemical data for water years 1958, 1960-63, 1965-77 are published in Water-Resources Investigations 78-23 and 79-24 as site PBQ 02.

#### WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

İ			•	MIER YUND		741221			, 251124-20		OXYGEN	COLI-	
	DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE MUMBER) (00027)	AGENCY AMA- LYZING SAMPLE (CODE NUMBER) (00028)	STREAM- FLOW, INSTAM- TANEOUS (CFS) (00061)	SPE- CIFIC COM- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (FTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	DEMAND, CHEM- ICAL (LOH LEVEL) (MG/L) (00335)	FORM, FECAL, 0.45 UM-MF (COLS./ 100 ML) (31616)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
j 1	OCT 28	0930	17002	17002	51	682	7.70	7.0	1.8	11.8	9	<10	360
	23	1400	17002	17002	72	645	7.70	8.5	2.0	9.3	10	K27	310
	JAN 26,	1100	17002	17002	150	682	6.80	0.0	4.1	12.9	8	K20	360
· Round !	MAR _08	1000	17002	17002	98	700	7.20	8.5	3.5	10.5	19	410	370
#ampling	APR 12	1600	17002	17002	168	678	7.30	12.5	8.4	10.2	10	K13	350
Round	MAY 17	1430	17002	17002	66	661	7.90	19.0	1.5	12.7	7	<b>K60</b>	340
I d sampling.	JUL 19	0730	17002	17002	29	653	7.40	21.5	8.4	7.3	13	K600	. 300
June, 88	AUG 11 SEP	1400	17002	17002	19	637	7.90	28.5	2.0	8.8	10	K170	350
	15	1230	17002	17002	• 16	628	7.60	21.0	1.1	7.6	13	K150	350
·	DATE	CALCIUM TOTAL RECOV- ERABLE (MG/L AS CA) (00916)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927)	MAGRE- SIUM, DIS- SOLVED (MG/L AS HG) (00925)	SODIUM, TOTAL RECOV- ERABLE (MG/L AS RA) (00929)	SODIUM, DIS- SOLVED (MG/L AS MA) : (00930)	POTAS- SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	RESIDUE TOTAL AT 105 DEG. C. SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	HITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)
:	OCT 28	TOTAL RECOV- ERABLE (HG/L AS CA)	DIS- SOLVED (MG/L AS CA)	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG)	SIUM, DIS- SOLVED (MG/L AS MG)	TOTAL RECOV- ERABLE (MG/L AS NA)	DIS- SOLVED (MG/L AS NA)	SIUM, TOTAL RECOV- ERABLE (MG/L AS K)	SIUM, DIS- SOLVED (MG/L AS K)	TOTAL AT 105 DEG. C. SUS- PENDED (MG/L)	VOLA- TILE, SUS- PENDED (MG/L)	GEK, NO2+NO3 TOTAL (MG/L AS N)	GEN, AHMONIA TOTAL (MG/L AS N)
:	OCT 28 NOV 23	TOTAL RECOV- ERABLE (MG/L AS CA) (00916)	DIS- SOLVED (MG/L AS CA) (00915)	STUM, TOTAL RECOV- ERABLE (MG/L AS HG) (00927)	SIUH, DIS- SOLVED (MG/L AS HG) (00925)	TOTAL RECOV- ERABLE (MG/L AS NA) (00929)	DIS- SOLVED (MG/L AS NA) : (00930)	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	SIUM, DIS- SOLVED (MG/L AS K) (00935)	TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	VOLA- TILE, SUS- PENDED (MG/L) (00535)	GEN, NOZ+NO3 TOTAL (MG/L AS N) (00630)	GEN, APPIONIA TOTAL (MG/L AS N) (00610)
:	OCT 28 NOV 23 JAN 25	TOTAL RECOV- ERABLE (MG/L AS CA) (00916)	DIS- SOLVED (MG/L AS CA) (00915)	SIUM, TOTAL RECOV- ERABLE (MG/L AS HG) (00927)	SIUH, DIS- SOLVED (MG/L AS HG) (00925)	TOTAL RECOV- ERABLE (MG/L AS NA) (00929)	DIS- SOLVED (MG/L AS RA) : (00930)	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	SIUM, DIS- SOLVED (MG/L AS K) (00935)	TOTAL AT 105 DEG. C. SUS- PEXDED (MG/L) (00530)	VOLA- TILE, SUS- PENDED (MG/L) (00535)	GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	GEN, AMMONIA TOTAL (MG/L AS N) (00610)
; ;	OCT 28 HOV 23 JAN 26 MAR 08	TOTAL RECOVERABLE (MG/L AS CA) (00916)	DIS- SOLVED (MG/L AS CA) (00915) 80	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927)	SIUM, DIS- SOLVED (MG/L AS MG) (00925)	TOTAL RECOV- ERABLE (MG/L AS RA) (00929) 8.2	DIS- SOLVED (MG/L AS RA): (00930)	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937)	SIUM, DIS- SOLVED (MG/L AS K) (00935)	TOTAL AT 105 DEG. C. SUS- PENDED (MG/L) (00530)	VOLATILE, SUS- PEMDED (MG/L) (00535)	GEN, NO2+NO3 TOTAL (MG/L AS N) (00630) 7.40 3.60	GEN, APPIONIA TOTAL (MG/L AS N) (00610) 0.220 0.090
	OCT 28 NOV 23 JAN 25 MAR 08 APR 12	TOTAL RECOV- ERABLE (MG/L AS CA) (00916) 85 79	DIS- SOLVED (MG/L AS CA) (00915) 80 72	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927) 42 35	STUH, DIS- SOLVED (HG/L AS HG) (00925) 40 32	TOTAL RECOV- ERABLE (MS/L AS NA) (00929) 8.2 5.0 7.8	DIS- SOLVED (HG/L AS RA): (00930) 7.8 5.5	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937) 1.3 0.6	SIUM, DIS- SOLVED (MG/L AS K) (00935) 1.3 0.30	TOTAL AT 105 DEG. C. SUS- PENDED (MG/L) (00530) 6 30 21	VOLATILE, SUS- PEMOED (MG/L) (00535)	GEN, NO2+NO3 TOTAL (MS/L AS N) (00630) 7.40 3.60 9.90	GEN, APPIONIA TOTAL (MG/L AS N) (00610) 0.220 0.090
; 	OCT 28 HOV 23 JAN 26 MAR 08 APR 12 HA17	TOTAL RECOVERABLE (MG/L AS CA) (00916) 85 79 86	DIS- SOLVED (MG/L AS CA) (00915) 80 72 83	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927) 42 35 39	STUH, DIS- SOLVED (MG/L AS MG) (00925) 40 32 37	TOTAL RECOV- ERABLE (M9/L AS NA) (00929) 8.2 5.0 7.8 9.7	DIS- SOLVED (MG/L AS RA): (00930) 7.8 5.5 7.5	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937) 1.3 0.6	SIUM, DIS- SOLVED (MG/L AS K) (00935) 1.3 0.30 1.0	TOTAL AT 105 DEG. C. SUS- PENDED (MG/L) (00530) 6 30 21	VOLA- TILE, SUS- PZHOZD (MG/L) (00535)	GEM, NO2+HO3 TOTAL (MG/L AS N) (00630) 7.40 3.60 9.90 8.50	GEN, APPIONIA TOTAL (MG/L AS N) (00810) 0.220 0.090 0.320 0.320
	OCT 28 NOV 23 JAN 25 MAR 08 APR 12 MAY 17 JUL 19	TOTAL RECOV- FRABLE (MG/L AS CA) (00916) 85 79 86 85	DIS- SOLVED (MG/L AS CA) (00915) 80 72 83 83	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927) 42 35 39 40	STUM, DIS- SOLVED (MG/L AS MG) (00925) 40 32 37 39	TOTAL RECOV- ERABLE (MG/L AS RA) (00929) 8.2 5.0 7.8 9.7	DIS- SOLVED (MG/L AS RA): (00930) 7.8 5.5 7.5 9.5	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937) 1.3 0.6 1.2	SIUM, DIS- SOLVED (MG/L AS K) (00935) 1.3 0.30 1.0	TOTAL AT 105 DEG. C. SUS- PENDED (NG/L) (00530)  6 30 21 11 35	VOLA- TILE, SUS- PZMDED (MG/L) (00535)	GEN, NO2+NO3 TOTAL (MG/L AS N) (00630) 7.40 3.60 9.90 8.50	GEN, APERIONIA TOTAL (MG/L AS N) (00610) 0.220 0.090 0.320 0.320 0.216
	OCT 28 NOV 23 JAN 25 MAR 08 APR 12 MAY 17 JUL	TOTAL RECOV- ERABLE (MG/L AS CA) (00916) 85 79 86 85 83	DIS- SOLVED (MG/L AS CA) (00915) 80 72 83 83 79	SIUM, TOTAL RECOV- ERABLE (MG/L AS MG) (00927) 42 35 39 40 38 39	STUH, DIS- SOLVED (MG/L AS MG) (00925) 40 32 37 39 36 39	TOTAL RECOV- ERABLE (M9/L AS NA) (00929) 8.2 5.0 7.8 9.7 8.1	DIS- SOLVED (MG/L AS RA): (00930) 7.8 5.5 7.5 9.5 7.9	SIUM, TOTAL RECOV- ERABLE (MG/L AS K) (00937) 1.3 0.6 1.2 1.2	SIUM, DIS- SOLVED (MG/L AS K) (00935) 1.3 0.30 1.0 1.1 0.79	TOTAL AT 105 DEG. C. SUS- PENDED (MG/L) (00530) 6 30 21 11 35	VOLA- TILE, SUS- PEXIOED (MG/L) (00535) 5 8 5 5 6	GEM, NO2+HO3 TOTAL (MG/L AS N) (00630) 7.40 3.60 9.90 8.50 12.0 8.40	GEN, APPIONIA TOTAL (MG/L AS N) (00810) 0.220 0.090 0.320 0.320 0.216 0.220

ROCK RIVER BASIN

#### 05440520 KILLBUCK CREEK NEAR NEW MILFORD, IL--Continued

#### WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	AMMONIA UN- IONIZED (MG/L AS N) (00619)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PBOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA) (01007)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, TOTAL RECOV- ERABLE (UG/L AS BE) (01012)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, TOTAL RECOV- ERABLE (UG/L AS B) (C1022)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)
OCT 28	0.002	0.030	<0.025	210	<50	60	71	<0.5	<0.5	<50	<50	<3
23	<0.001	0.070	<0.010	450	<50	60	46	<0.5	<0.5	<50	<50	<3
ja <b>n</b> 26	<0.001	0.060	0.030	480	<50	80	70	<0.5	<0.5	<50	<50	<3
MAR 08	<0.001	0.070	0.040	310	<50	80	70	<0.5	<0.5	<50	<50	<3
APR 12	<0.001	0.090	0.040	500	<50	90	73	<0.5	<0.5	<50	<50	<3
HAY 17	0.007	0.020	0.010	170	90	80	75	<0.5	<0.5	<50	<50	<3
JUL 19	0.007	0.100	0.050	620	60	80	75	<0.5	<0.5	<50	<50	<3
AUG 11	0.016	0.080	0.040	480	<50	80	74	<0.5	<0.5	<50	<50	<3
SEP 15	0.011	0.040	0.010	100	<50	80	80	<0.5	<0.5	<50	<50	<3
DATE	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IROM, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, TOTAL RECOV- FRABLE (UG/L AS PB) (01051)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS HM) (01055)
oct	DIS- SOLVED (UG/L AS CD) (01025)	MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	MIUM, DIS- SOLVED (UG/L AS CR) (01030)	TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	DIS- SOLVED (UG/L AS CO) (01035)	TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040)	TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	DIS- SOLVED (UG/L AS FE) (01046)	TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	DIS- SOLVED (UG/L AS PB) (01049)	NESE, TOTAL RECOV- ERABLE (UG/L AS HM) (01055)
OCT 28	DIS- SOLVED (UG/L AS CD) (01025)	MIUH, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	MIUM, DIS- SOLVED (UG/L AS CR) (01030)	TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	DIS- SOLVED (UG/L AS CO) (01035)	TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040)	TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	DIS- SOLVED (UG/L AS FE) (01046)	TOTAL RECOV- ERABLE (UG/L AS PB) (01051)	DIS- SOLVED (UG/L AS PB) (01049)	NESE, TOTAL RECOV- ERABLE (UG/L AS HM) (01055)
OCT 28 NOV 23 JAN	DIS- SOLVED (UG/L AS CD) (01025)	MIUH, TOTAL RECOV- ERABLE (UG/L AS CR) (01034)	MIUH, DIS- SOLVED (UG/L AS CR) (01030)	TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	DIS- SOLVED (UG/L AS CO) (01035)	TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040)	TOTAL RECOVERABLE (UG/L AS FE) (01045)	DIS- SOLVED (UG/L AS FE) (01046) <50	TOTAL RECOV- ERABLE (UG/L AS FB) (01051) <50	DIS- SOLVED (UG/L AS PB) (01049)	NESE, TOTAL RECOV- ERABLE (UG/L AS HW) (01055)
OCT 28 NOV 23 JAN 25	DIS- SOLVED (UG/L AS CD) (01025)	MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) <5 <5	MIUH, DIS- SOLVED (UG/L AS CR) (01030) <5 <5	TOTAL RECOV- ERABLE (UG/L AS CO) (01037)	DIS- SOLVED (UG/L AS CO) (01035)	TOTAL RECOV- ERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040) <5 <5	TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740	DIS- SOLVED (UG/L AS FE) (01046) <50 <50	TOTAL RECOV- PRABLE (UG/L AS FB) (01051) <50 <50 <50	DIS- SOLVED (UG/L AS PB) (01049) <50 <50	NESE, TOTAL RECOV- ERABLE (UG/L AS HN) (01055) 44 100
OCT 28 1007 23 JAN 25 MAR 08	DIS- SOLVED (UG/L AS CD) (01025) <3 <3 <3 <3	MIUH, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) <5 <5 <5	MIUH, DIS- SOLVED (OLG/L AS CR) (01030) <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS CO) (01037) <5 <5 <5	DIS- SOLVED (UG/L AS CO) (01035) <5 <5 <5	TOTAL RECOVERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040) <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740 480	DIS- SOLVED (UG/L AS FE) (01046) <50 <50 <50	TOTAL RECOV- PRABLE (UG/L AS PB) (01051) <50 <50 <50	DIS- SOLVED (UG/L AS PB) (01049) <50 <50 <50	NESE, TOTAL RECOV- ERABLE (UG/L AS HW) (01055) 44 100 47
OCT 28 10.7 23 JAH 25 MAR 08 AFR 12 MAY	DIS- SOLVED (UG/L AS CD) (01025) <3 <3 <3 <3 <3	MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) <5 <5 <5 <5	MIUH, DIS- SOLVED (UG/L AS CR) (01030) <5 <5 <5 <5	TOTAL RECOV- PRABLE (UG/L AS CO) (01037) <s <s="" <s<="" th=""><th>DIS- SOLVED (UG/L AS CO) (01035)  &lt;\$ 5 &lt;5 &lt;5 &lt;5 &lt;5</th><th>TOTAL RECOVERABLE (UG/L AS CU) (01042)  &lt;5 &lt;5 &lt;5 &lt;5 &lt;5</th><th>DIS- SOLVED (UG/L AS CU) (01040) &lt;5 &lt;5 &lt;5 &lt;5</th><th>TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740 480 790</th><th>DIS- SOLVED (UG/L AS FE) (01046) &lt;50 &lt;50 &lt;50 &lt;50</th><th>TOTAL RECOV- PRABLE (UG/L AS FB) (01051) &lt;50 &lt;50 &lt;50 &lt;50 &lt;50 &lt;50 &lt;50 &lt;50 &lt;50 &lt;50</th><th>DIS- SOLVED (UG/L AS PB) (01049) &lt;50 &lt;50 &lt;50 &lt;50</th><th>NESE, TOTAL RECOVERABLE (UG/L AS MR) (01055) 44 100 47 51</th></s>	DIS- SOLVED (UG/L AS CO) (01035)  <\$ 5 <5 <5 <5 <5	TOTAL RECOVERABLE (UG/L AS CU) (01042)  <5 <5 <5 <5 <5	DIS- SOLVED (UG/L AS CU) (01040) <5 <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740 480 790	DIS- SOLVED (UG/L AS FE) (01046) <50 <50 <50 <50	TOTAL RECOV- PRABLE (UG/L AS FB) (01051) <50 <50 <50 <50 <50 <50 <50 <50 <50 <50	DIS- SOLVED (UG/L AS PB) (01049) <50 <50 <50 <50	NESE, TOTAL RECOVERABLE (UG/L AS MR) (01055) 44 100 47 51
OCT 28 1009 23 JAN 25 MAR 08 APR 12 HAY 17 JUL	DIS- SOLVED (UG/L AS CD) (01025) <3 <3 <3 <3	MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) <5 <5 <5 <5 <5	MIUH, DIS- SOLVED (OLG/L AS CR) (01030) <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS CO) (01037) <5 <5 <5	DIS- SOLVED (UG/L AS CO) (01035) <5 <5 <5	TOTAL RECOVERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040) <5 <5 <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740 480 790 230	DIS- SOLVED (UG/L AS FE) (01046) <50 <50 <50 <50 <50	TOTAL RECOV- PRABLE (UG/L AS FB) (01051) <50 <50 <50 <50 <50 <50 <50 <50 <50 <50	DIS- SOLVED (UG/L AS PB) (01049) <50 <50 <50 <50 <50	NESE, TOTAL RECOV- ERABLE (UG/L AS HR) (01055) 44 100 47 51 43 41
OCT 28 BOY 23 JAH 25 MAR 08 APR 12 HAY 17	DIS- SOLVED (UG/L AS CD) (01025) <3 <3 <3 <3 <3	MIUM, TOTAL RECOV- ERABLE (UG/L AS CR) (01034) <5 <5 <5 <5	MIUH, DIS- SOLVED (OUG/L AS CR) (01030) <5 <5 <5 <5 <5	TOTAL RECOVERABLE (UG/L AS CO) (01037)	DIS- SOLVED (UG/L AS CO) (01035)  <5 <5 <5 <5 <5 <5	TOTAL RECOVERABLE (UG/L AS CU) (01042)	DIS- SOLVED (UG/L AS CU) (01040) <5 <5 <5 <5	TOTAL RECOV- ERABLE (UG/L AS FE) (01045) 330 1000 740 480 790	DIS- SOLVED (UG/L AS FE) (01046) <50 <50 <50 <50	TOTAL RECOV- PRABLE (UG/L AS FB) (01051) <50 <50 <50 <50 <50 <50 <50 <50 <50 <50	DIS- SOLVED (UG/L AS PB) (01049) <50 <50 <50 <50	NESE, TOTAL RECOVERABLE (UG/L AS MR) (01055) 44 100 47 51

ROCK RIVER BASIN 05440520 KILLBUCK CREEK NEAR NEW MILFORD, IL--Continued

#### WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1986

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, TOTAL RECOV- ERABLE (UG/L AS SR) (01082)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VAKA- DIUM, TOTAL (UG/L AS V) (01087)	VARA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
oct											
28	24	<5	<5	<3	<3.0	110	100	<5	<5	<100	<50
NOV 23 Jan	65	<5	<5	<3	<3.0	80	75	<5	<5	190	230
26	27	<5	<5	<3	<3.0	110	110	<5	<5	<50	<50
MAR 08 APR	35	<5	<5	<3	<3.0	110	110	<5	<5	<50	<50
12 HAY	9	<5	<5	<3	<3.0	110	110	<5	<5 [.]	<50	<100
17 JUL	30	<5	<5	<3	<3.0	110	110	<5	<5	<100	<50
19	30	<5	<5	<3	<3.0	90	91	<5	<5	<50	<50
AUG 11	35	<5	<5	<3	<3.0	80	83	<5	<5	<50	<50
SEP 15	77	<5	5	<3	<3.0	80	85	<5	<5	100	<100